Display Attached Controller
@E.Terminal for MC

USER'S MANUAL

<Functions>

FEH301b

Preface

This function edition of the user's manual describes functions and usage of the @E.Terminal for MC.
In order to operate the product properly, please read this user's manual carefully. When using modules or peripheral devices, be sure to read the corresponding user's manuals listed below.

Name	Manual No.	Contents
@E.Terminal for MC User's Manual <Hardware>	FEH300	Describes system composition, specifications, and handling of the @E.Terminal for MC.
V8 Series Hardware Specifications	2016Nex	Hardware specifications and handling procedures of the MONITOUCH V8 series are explained.
V8 Series Hardware Specifications	2017Nex	Hardware specifications and handling procedures of the MONITOUCH V8 series are explained.
V8 Series Reference Manual	1055Nex	Functions of the MONITOUCH V8 series are explained in details.
V Sereis Macro Reference	1056Nex	An overview of macros of V-SFT version 5 as well as macro editor operations and macro command descriptions.
V8 Series Introduction Manual	1057Nex	The basic operating procedure of V-SFT version 5 is explained in detail.
V8 Series Operation Manual	1058Nex	The operations about the composition of V-SFT version 5, how to edit each items, and restrictions etc. are explained.
V8 Series Connection Manual	2201NE	The connection and communication parameters for the V8 series and controllers are explained in detail.
User's Manual Hardware, MICREX-SX series SPH	FEH201	Describes the system configuration, the specifications and operations of modules in the MICREX-SX series.
User's Manual Instruction (Standard Loader), MICREX-SX series	FEH588	Describes the memory, language and system definitions of the MICREX-SX series.
User's Manual SX-Programmer Standard <Reference>, MICREX-SX series	FEH590	Describes the menu and icon of the SX-Programmer Standard all of the operations of the SX-Programmer Standard.
User's Manual Instruction (D300win), MICREX-SX series	FEH200	Describes the memory, language and system definitions of the MICREX-SX series.
User's Manual D300win <Reference>, MICREX-SX series	FEH257	Describes the menu and icon of D300winV3 and all of the operations of D300winV3.
FALDIC α series User's Manual, RYS-V Type	MHT258(Eng)	Describes the specifications and operations of FALDIC α series.
ALPHA 5 series User's Manual, RYT-SX Type	MEHT301	Describes the specifications and operations of ALPHA 5 series.

* In addition to the above manuals, the following Fuji Electric Systems Co., Ltd. site offers various manuals and technical documents associated with MICREX-SX.

URL http://www.fesys.co.jp/eng/

Notes

1. This manual may not be reproduced in whole or part in any form without prior written approval by the manufacturer.
2. The contents of this manual (including specifications) are subject to change without prior notice.
3. If you find any ambiguous or incorrect descriptions in this manual, please write them down (along with the manual No. shown on the cover) and contact FUJI.

Safety Precautions

Be sure to read the “Safety Precautions” thoroughly before using the product.
Here, the safety precautions items are classified into “Warning” and “Caution”.

Warning : Incorrect handling of the device may result in death or serious injury.

Caution : Incorrect handling of the device may result in minor injury or physical damage.

Even some items indicated by “Caution” may result in a serious accident.
Both safety instruction categories provide important information. Be sure to strictly observe these instructions.

Warning

- Never use the output signal of @E.Terminal for operations that may threaten human life or damage the system, such as signals used in case of emergency. Please design the system so that it can cope with the malfunctions of a touch switch. A malfunction of a touch switch will result in machine accident or damage.
- Turn off the power supply when you set up the unit, connect new cables or perform maintenance or inspections. Otherwise, electrical shock or damage may occur.
- Never touch any terminals while the power is on. Otherwise, electric shock may occur.
- You must put a cover on the terminals on the unit when you turn the power on and operate the unit. Otherwise, electric shock may occur.
- The liquid crystal in the LCD panel is a hazardous substance. If the LCD panel is damaged, do not ingest the leaked liquid crystal. If the liquid crystal spills on skin or clothing, use soap and wash off thoroughly.
- Never disassemble, recharge, deform by pressure, short-circuit, reverse the polarity of the lithium battery, nor dispose of the lithium battery in fire. Failure to follow these conditions will lead to explosion or ignition.
- Never use a lithium battery that is deformed, leaks, or shows any other signs of abnormality. Failure to follow these conditions will lead to explosion or ignition.
- The power lamp flashes when the backlight is at the end of life or is faulty. However, the switches on the screen are operable at this time. Do not touch the screen when the screen becomes dark and the power lamp flashes. Otherwise, a malfunction may occur and result in machine accident or damage.

Safety Precautions

Caution

- Check the appearance of the unit when it is unpacked. Do not use the unit if any damage or deformation is found. Failure to do so may lead to fire, damage or malfunction.
- For use in a facility or for a system related to nuclear energy, aerospace, medical, traffic equipment, or mobile installations, please consult your local distributor.
- Operate (or store) @E.Terminal under the conditions indicated in this manual and related manuals. Failure to do so could cause fire, malfunction, physical damage or deterioration.
- Understand the following environmental limits for use and storage of @E.Terminal. Otherwise, fire or damage to the unit may result.
  - Avoid locations where there is a possibility that water, corrosive gas, flammable gas, solvents, grinding fluids or cutting oil can come into contact with the unit.
  - Avoid high temperature, high humidity, and outside weather conditions, such as wind, rain or direct sunlight.
  - Avoid locations where excessive dust, salt, and metallic particles are present.
  - Avoid installing the unit in a location where vibration or physical shock may be transmitted.
- Equipment must be correctly mounted so that the main terminal of @E.Terminal will not be touched inadvertently. Otherwise, an accident or electric shock may occur.
- Check periodically that terminal screws on the power supply terminal block and fixtures are firmly tightened. Loosened screws may result in fire or malfunction.
- Tighten terminal screws on the power supply terminal block of display part equally to a torque of 0.8 N·m for the NP5M0101-5H4/NP5M0101-4H4, or 1.2 N·m for the NP5M0101-3H4. And tighten terminal screws on the power supply terminal block of the controller unit equally to a torque of 0.5 to 0.6 N·m. Improper tightening of screws may result in fire, malfunction, or trouble.
- Tighten mounting screws on the unit equally to a torque of 0.5 to 0.7 N·m. Excessive tightening may distort the panel surface. Loose tightening may cause @E.Terminal to come off, malfunction or be short-circuited.
- @E.Terminal has a glass screen. Do not drop or give physical shock to the unit. Otherwise, the screen may be damaged.
- Connect the cables correctly to the terminals of @E.Terminal in accordance with the specified voltage and wattage. Over-voltage, over-wattage, or incorrect cable connection could cause fire, malfunction or damage to the unit.
- Be sure to establish a ground of @E.Terminal. The FG terminal must be used exclusively for the unit with the level of grounding resistance less than 100∧. Otherwise, electric shock or a fire may occur.
- Prevent any conductive particles from entering into @E.Terminal. Failure to do so may lead to fire, damage, or malfunction.
- After wiring is finished, remove the paper used as a dust cover before starting to operate @E.Terminal. Operation with the cover attached may result in accident, fire, malfunction, or trouble.
- Do not attempt to repair @E.Terminal at your site. Ask us or the designated contractor for repair.
- Do not repair, disassemble or modify @E.Terminal. We are not responsible for any damages resulting from repair, disassembly or modification of @E.Terminal that was performed by an unauthorized person.
- Do not use a sharp-pointed tool when pressing a touch switch. Doing so may damage the screen. Doing so may damage the screen.
- Only experts are authorized to set up the unit, connect the cables or perform maintenance and inspection.
- Lithium batteries contain combustible material such as lithium or organic solvent. Mishandling may cause heat, explosion or ignition resulting in fire or injury. Read related manuals carefully and handle the lithium battery correctly as instructed.
- When using @E.Terminal that has analog switch resolution with resistance film, do not press two or more points on the screen at the same time. If two or more positions are pressed at the same time, the switch located between the pressed positions activates.
- Take safety precautions during such operations as setting change during running, forced output, start, and stop. Any misoperation may cause unexpected machine motions, resulting in machine accident or damage.
- In facilities where a failure of @E.Terminal could lead to accident threatening human life or other serious damage, be sure that the facilities are equipped with adequate safeguards.
- At the time of disposal, @E.Terminal must be treated as industrial waste.
- Before touching @E.Terminal, discharge static electricity from your body by touching grounded metal. Excessive static electricity may cause malfunction or trouble.
- The LED lamp on the CF card interface cover illuminates in red when the power is supplied to the CF card. Never remove the CF card or turn off the power of @E.Terminal while the LED lamp is lit. Doing so may destroy the data on the CF card. Check that the LED lamp has gone off before removing the CF card or turning off the power of @E.Terminal.

Safety Precautions

[General Notes]

- Never bundle control cables nor input/output cables with high-voltage and large-current carrying cables such as power supply cables. Keep these cables at least 200 mm away from the high-voltage and large-current carrying cables. Otherwise, malfunction may occur due to noise.
- When using @E.Terminal in an environment where a source of high-frequency noise is present, it is recommended that the FG shielded cable (communication cable) be grounded at its ends. However, the cable may be grounded only at one end if this is necessary due to unstable communication conditions or for any other reason.
- Plug connectors or sockets of @E.Terminal in the correct orientation. Failure to do so may lead to damage or malfunction.
- If a LAN cable is inserted into the MJ1 or MJ2 connector on @E.Terminal, the counterpart device may be damaged. Check the indication on the unit and insert a cable into the correct position.
- Do not use thinners for cleaning because they may discolor @E.Terminal surface. Use alcohol or benzene commercially available.
- If a data receive error occurs when @E.Terminal and the counterpart (PLC, temperature controller, etc.) are started at the same time, read the manual for the counterpart unit and remove the error correctly.
- Avoid discharging static electricity on the mounting panel of @E.Terminal. Static charges can damage the unit and cause malfunctions. Otherwise, malfunction may occur due to noise.
- Avoid prolonged display of any fixed pattern. Due to the characteristics of the liquid crystal display, an afterimage may occur. If a prolonged display of a fixed pattern is expected, use the auto OFF function of the backlight.

[Notes on LCD]

Note that the following conditions may occur under normal circumstances.

- The response time, brightness and colors of @E.Terminal may be affected by the ambient temperature.
- Tiny spots (dark or luminescent) may appear on the display due to the liquid crystal characteristics.
- There are variations in brightness and colors on each unit.
- Cold cathode tubes are incorporated into the LCD display for backlights. Optical properties (brightness, irregular colors, etc.) may change in a low-temperature environment or over time of operation.

Revisions

Printed on	Manual No.	Revision contents
Oct. 2008	FEH301	First edition
Nov. 2008	FEH301a	Display unit is changed from UG40 series to V8 series.
Jun. 2009	FEH301b	The contents are reconsidered.

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Section 1 General

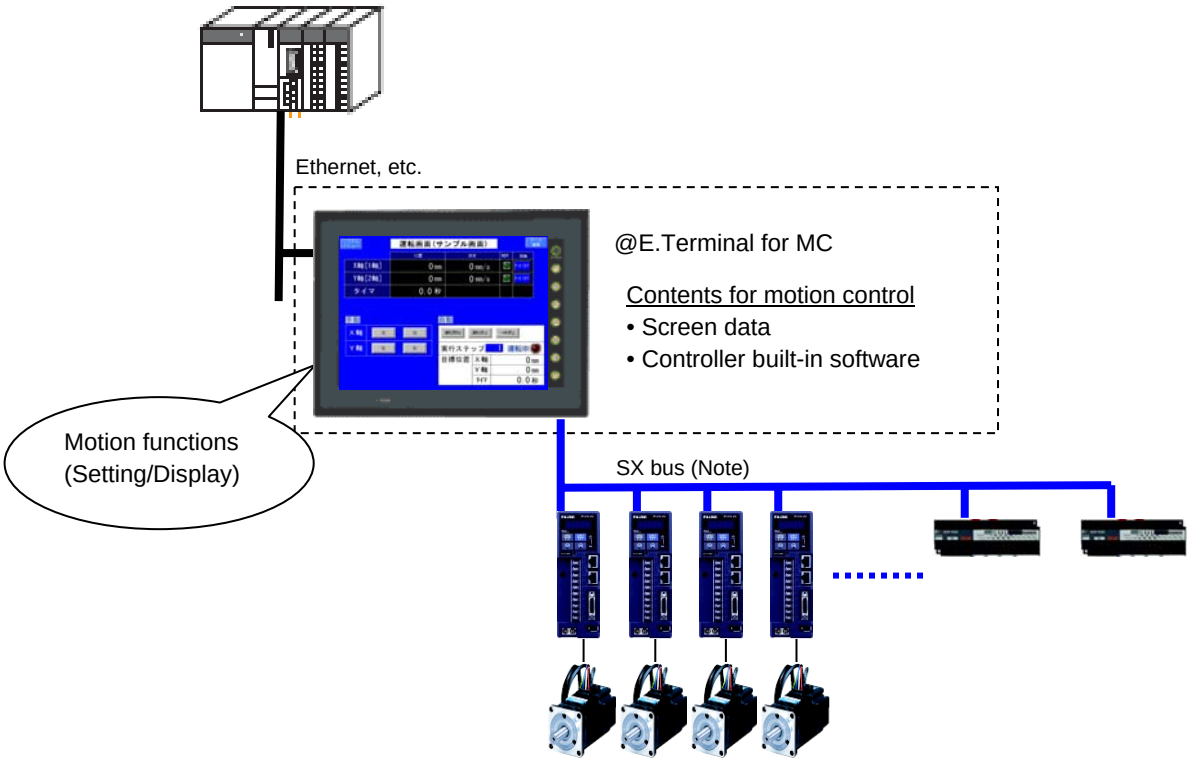
1-1 Overview of @E.Terminal for MC

The @E.Terminal for MC Display Attached Controller is an all-in-one programmable operation display and motion controller.

Features:

1) The guidance function of the display screen allows you to easily set up parameters and positioning data previously set up by a dedicated machine.
   Also, it enables easy equipment maintenance.
2) The SX bus allows one-touch connection of up to eight servo amplifiers (axes) (FALDIC-α and ALPHA5 VS type), minimizing the need for wires. (5.7 inch model can connect up to 4 of ALPHA5 VS type)
3) The upper level controller can be connected by Ethernet and the like.
4) The lineup includes four different display screen sizes. 5.7 inch, 8 inch, 10 inch and 12 inch models are available.
5) The content corresponding to motion is supplied in the standard package.
   Content for PTP control and synchronous control (ratio synchronization, cycle synchronization, flying shear, and rotary shear) are provided.
6) Screen supports two languages (Japanese/English). (* 5.7 inch model is available for only Japanese.)

Product types	Display size	Specifications		Language	
				Japanese	English
NP5M0101-5H4	12.1 inch	TFT color	- 800 x 600 dots, Max. 8 axes - Servo: FALDC-α, ALPHA5	Available	Available
NP5M0101-4H4	10.4 inch	TFT color			
NP5M0101-3H4	8.4 inch	TFT color			
NP5M0101-2S4	5.7 inch	TFT color	- 320 x 240 dots, Max. 4 axes - Servo: FALDC ALPHA5	Abailable	Not available
NP5M0101-2L4	5.7 inch	STN color			



Note: The SX bus is a MICREX-SX series dedicated high-speed serial bus.

Section 1 General

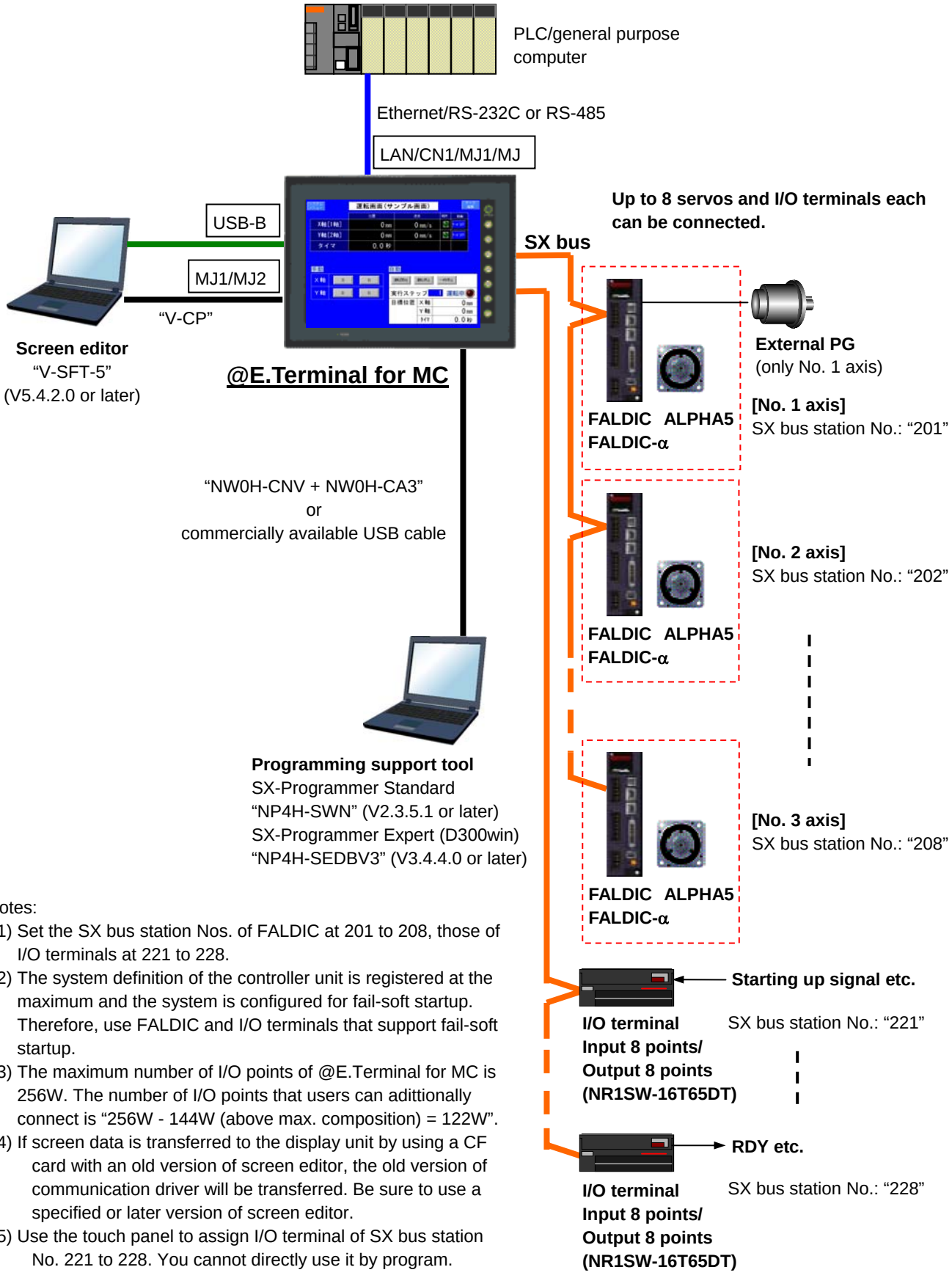
1-2 Motion Function Specifications

@E.Terminal for MC has the following functions.

Item		Specification
No. of controllable axes		Max. 8
Control method	Single operation	Manual operation, Homing, PTP (Point To Point) positioning, Interrupt positioning
	Synchronous operation	Ratio synchronous, Cycle synchronous, Rotary shear, Flying shear
	Master axis selection	External pulse (connected to axis 1), Virtual master axis, Axis 1
Control cycle		5ms (SX bus tact) Execution bandwidth proportion setting 3:5:2 [Application : Contents : System]
Mechanism selection		Timing belt, Ball screw, Sealer/Cutter, Feed roll
Unit of control		PLS, mm
Unit of speed		Unit of control/s, r/min (velocity of servo motor)
Interpolation operation		2-axis linear interpolation (1-2 axes, 3-4 axes, 5-6 axes, 7-8 axes)
Interrupt method		PTP operation: ABS (absolute position), INC (relative position) Interrupt operation: INC (relative position) Interpolation operation: ABS (absolute position), INC (relative position)
Max. travel amount		-2147483648 to 2147483647 [pulses] = Max. travel amount at a time
Max. speed		FALDIC ALPHA5:6000r/min FALDIC-α: 5000r/min * The max. velocity varies depending on the servomotor. For more information, refer to the user's manual of FALDIC ALPHA5 or FALDIC-α.
Acceleration/deceleration time		Sync axis: 0 to 3000ms Virtual master axis: 0 to 65535ms
S-curve ratio		Sync axis: 0 to 100% Virtual master axis: None
Sync auxiliary function	Mark compensation	Provided (Cycle synchronous, Rotary shear, Flying shear)
	Sync timing adjustment	Provided (Cycle synchronous, Rotary shear, Flying shear)
	Cycle stop	Master axis (External pulse, Virtual master axis): Provided Sync axis: Provided (Cycle synchronous, Rotary shear, Flying shear)
Configuration registration		Mechanism setting of 8 axes, Master axis setting, I/O terminal registration
Test run		Manual operation, Homing, PTP (Point To Point) positioning, interrupt positioning, synchronous operation
Failure diagnosis	Controller	Fault RAS indication, CF card backup function
	Servo amplifier	I/O status indication, Alarm indication
	Motion contents	Alarm indication
Servo loader		FALDIC parameter reading/writing function CF card reading/writing function
Waveform sampling		Obtains speed frequencies of 8 axes at a time. Sampling cycle (5 to 495ms) Max. sampling points: 500 points/axis Trigger function (speed data, zero deviation, zero speed, torque limit detection, deviation overflow)
CF card		Reading/writing of registered configuration data (Max. 10)

1-3 System Composition

The following illustration shows the system composition of @E.Terminal for MC.

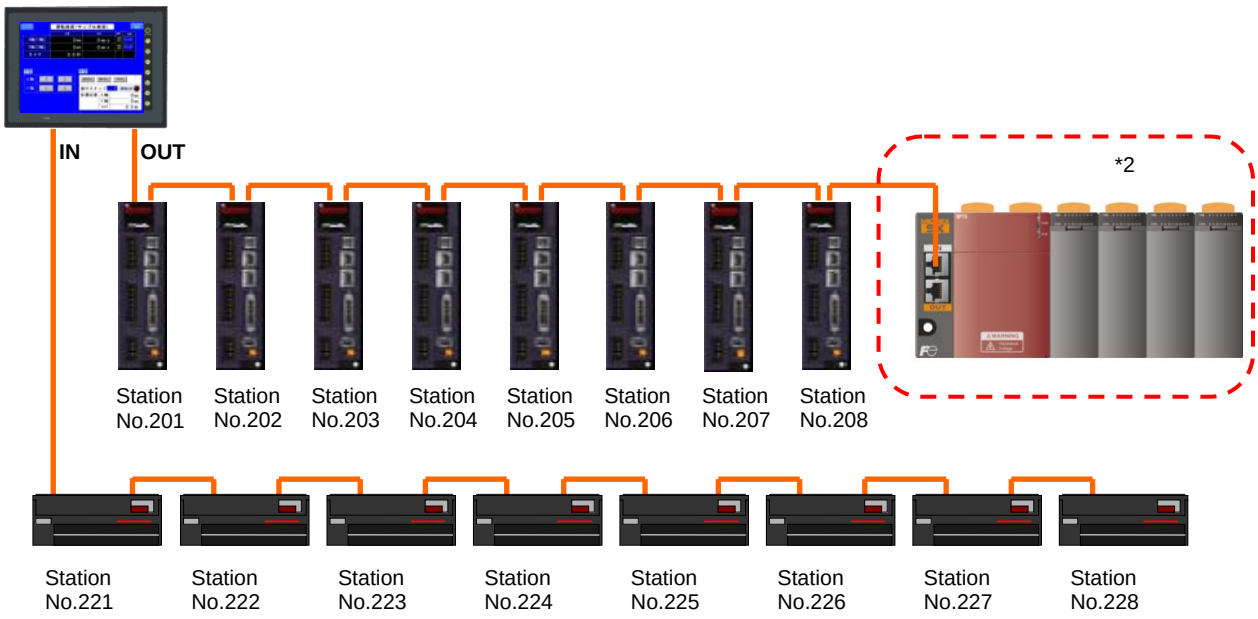


Notes:

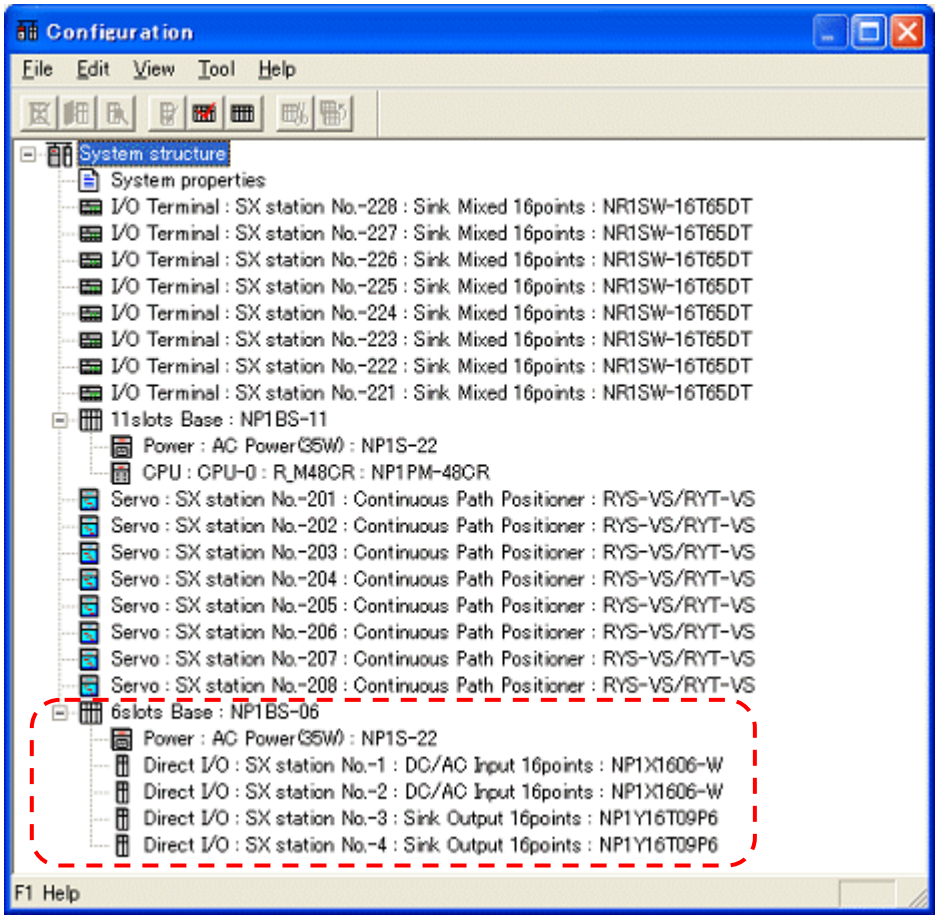
1) Set the SX bus station Nos. of FALDIC at 201 to 208, those of I/O terminals at 221 to 228.
2) The system definition of the controller unit is registered at the maximum and the system is configured for fail-soft startup. Therefore, use FALDIC and I/O terminals that support fail-soft startup.
3) The maximum number of I/O points of @E.Terminal for MC is 256W. The number of I/O points that users can adittionally connect is "256W - 144W (above max. composition) = 122W".
4) If screen data is transferred to the display unit by using a CF card with an old version of screen editor, the old version of communication driver will be transferred. Be sure to use a specified or later version of screen editor.
5) Use the touch panel to assign I/O terminal of SX bus station No. 221 to 228. You cannot directly use it by program.

Notes on system configuration

The following illustration shows the connection method of servo amplifiers and I/O terminals connected to the SX bus.



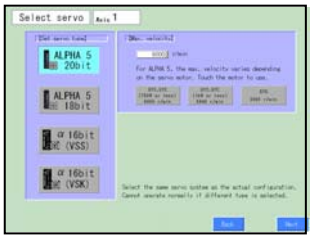
*1 Connect I/O terminals to the IN side of the controller and servo amplifiers to the OUT side.
*2 You can add up to 112W of I/O. In case of this, use SX bus station No. 1 to 200.


Configuration
File Edit View Tool Help
System structure
System properties
I/O Terminal : SX station No.-228 : Sink Mixed 16points : NR1SW-16T65DT
I/O Terminal : SX station No.-227 : Sink Mixed 16points : NR1SW-16T65DT
I/O Terminal : SX station No.-226 : Sink Mixed 16points : NR1SW-16T65DT
I/O Terminal : SX station No.-225 : Sink Mixed 16points : NR1SW-16T65DT
I/O Terminal : SX station No.-224 : Sink Mixed 16points : NR1SW-16T65DT
I/O Terminal : SX station No.-223 : Sink Mixed 16points : NR1SW-16T65DT
I/O Terminal : SX station No.-222 : Sink Mixed 16points : NR1SW-16T65DT
I/O Terminal : SX station No.-221 : Sink Mixed 16points : NR1SW-16T65DT
11slots Base : NP1BS-11
Power : AC Power(35W) : NP1S-22
CPU : CPU-0 : R_M48CR : NP1PM-48CR
Servo : SX station No.-201 : Continuous Path Positioner : RYS-VS/RYT-VS
Servo : SX station No.-202 : Continuous Path Positioner : RYS-VS/RYT-VS
Servo : SX station No.-203 : Continuous Path Positioner : RYS-VS/RYT-VS
Servo : SX station No.-204 : Continuous Path Positioner : RYS-VS/RYT-VS
Servo : SX station No.-205 : Continuous Path Positioner : RYS-VS/RYT-VS
Servo : SX station No.-206 : Continuous Path Positioner : RYS-VS/RYT-VS
Servo : SX station No.-207 : Continuous Path Positioner : RYS-VS/RYT-VS
Servo : SX station No.-208 : Continuous Path Positioner : RYS-VS/RYT-VS
6slots Base : NP1BS-06
Power : AC Power(35W) : NP1S-22
Direct I/O : SX station No.-1 : DC/AC Input 16points : NP1X1606-W
Direct I/O : SX station No.-2 : DC/AC Input 16points : NP1X1606-W
Direct I/O : SX station No.-3 : Sink Output 16points : NP1Y16T09P6
Direct I/O : SX station No.-4 : Sink Output 16points : NP1Y16T09P6
F1 Help

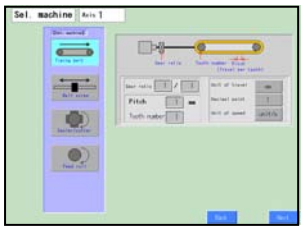
1-4 Motion Operation Setting Procedure

You can set motion operations on the display with ease, as shown below.

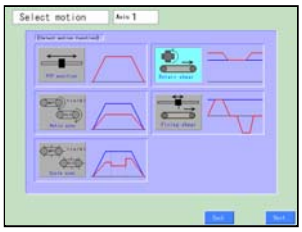
Select FALDIC to use.



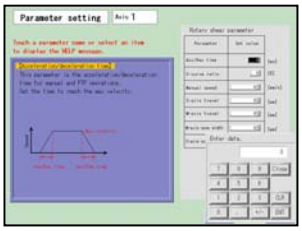
Select a mechanism of the synchronous axis.



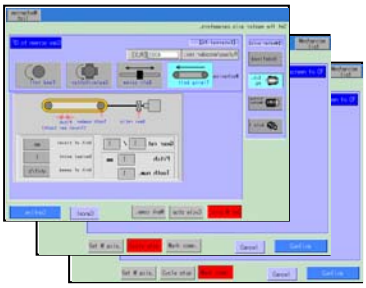
Select a motion function.



Set the parameters regarding motion operations.



Set the parameters regarding motion operations of the master axis.



Now, setting has been completed.
Set the synchronous command to ON to operate the master axis, and motion operation will start.

* For more information about screen operations, refer to “Section 4. Screen Specification”

1-5 FALDIC Parameter Setting

You need to set the following parameters of FALDIC to use @E.Terminal for MC.
The parameters whose initial values are required to change are shown below.

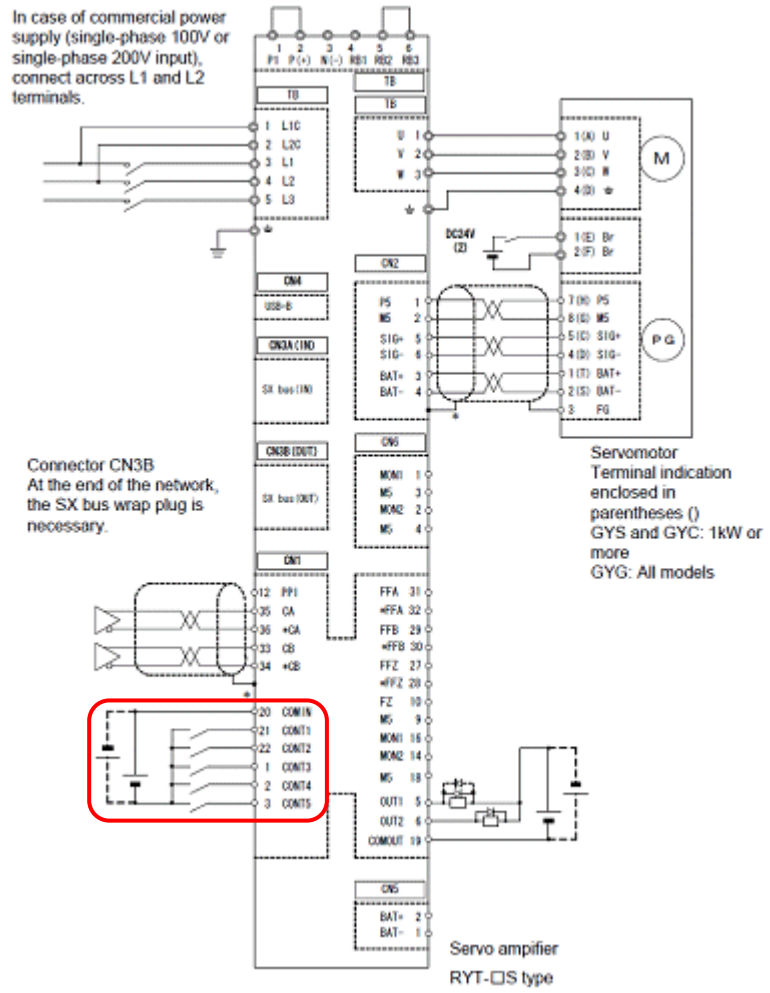
FALDIC ALPHA5

1) PA1-06: Numerator of electrical gear	16 → 1
2) PA2-72: Station number	00 → SX bus station No. of servo (201-208)
3) PA3-01: CONT1 signal assignment	49 → 49 (Interrupt input) Initial value
4) PA3-02: CONT2 signal assignment	00 → 10 (Forced stop)
5) PA3-03: CONT3 signal assignment	00 → 7 (+OT) ・・・No need to set if OT is not used.
6) PA3-04: CONT4 signal assignment	00 → 8 (-OT) ・・・No need to set if OT is not used.
7) PA3-05: CONT5 signal assignment	00 → 6 (Home position LS) ・・・No need to set if homing is not used.

FALDIC-α

1) Standard parameter 91: Command pulse correction α	8 → 1
2) System parameter 01: CONT1 signal assignment	49 → 49 (Interrupt input) Initial value
3) System parameter 02: CONT2 signal assignment	00 → 10 (Forced stop)
4) System parameter 03: CONT3 signal assignment	00 → 7 (+OT) ・・・No need to set if OT is not used.
5) System parameter 04: CONT4 signal assignment	00 → 8 (-OT) ・・・No need to set if OT is not used.
6) System parameter 05: CONT5 signal assignment	00 → 6 (Home position LS) ・・・No need to set if homing is not used.
7) System parameter 96: Station No.	00 → SX bus station No. of servo (201 to 208)

* Insert, forced stop, +OT, -OT, and homing LS are connected to FALDIC.


In case of commercial power supply (single-phase 100V or single-phase 200V input), connect across L1 and L2 terminals.
Connector CN3B
At the end of the network, the SX bus wrap plug is necessary.
Servomotor
Terminal indication enclosed in parentheses ()
GYS and GYC: 1kW or more
GYG: All models
Servo ampifier
RYT-□S type

1-6 Resources Used by Contents

The contents of @E.Terminal for MC use the following resources of the display unit and controller unit.

(1) Display unit

Resource	Resource for @E.Terminal for MC	Resource open to users
Screen	800 to 1023	0 to 799
Attribute table	240 to 255	0 to 239
Internal memory	$u0 to 16383	$u16384 to 32767

In addition, the following common settings are required. Do not change.

- [System setting] – [Main body setting] – [Overlap] → [Dot]
- [System setting] – [Font] → [Gothic]
- [System setting] – [Connected device setting] – [PLC1] setting

* Use the resource open to users for user-created screens.

(2) Controller unit

	Item	Template for @E.Terminal for MC	Usage in user application
System definition	SX bus station No.	201 and higher Nos. are used. System configuration definitions are set as follows: 201 to 208 for FALDIC、221 to 228 for I/O terminal	1 to 200 are available.
	Fail-soft startup setting	Set for 201 or higher.	Cannot be changed to 201 or lower No.
	SX bus tact	5ms	Not changeable
	Execution bandwidth proportion setting	3:5:2	Not changeable
	I/O group setting	FALDIC and I/O terminals are assigned to “Built-in application”.	Assignable other than “Built-in application”
	Fault status display mask	ON	Not changeable
	Configuration check waiting time	5s	Changeable
Memory assignment	Memory assignment	Used as an interface. Standard memory: 20K Retain memory: 10K	Not changeable
Program	Program area	Not used	Available

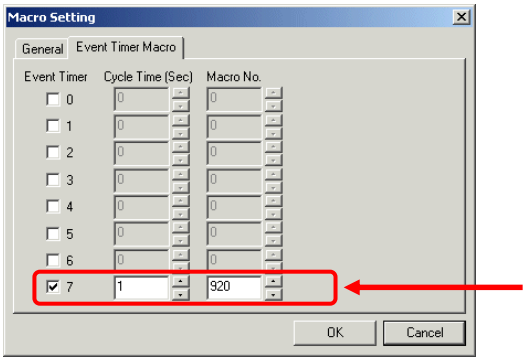
* Do not delete FALDIC and I/O terminal registered in system definition of template.

1-7 Precautions for Use

1) Be sure to match the servo amplifier selected in the configuration definition to that in the actual configuration.
2) If an error occurs in the controller unit due to low battery voltage, replace the battery immediately. Without battery replacement, set data such as system configuration will be lost.
   It is recommended to back up (CF card function of the menu) the data in a CF card.
3) When the servomotor is operated by the PLC using the 8WAY function or from the display unit, even if a communication error occurs between the display unit and controller unit, the servomotor continues operation.
   If you want to stop the operation upon detection of a communication error, add the following application.

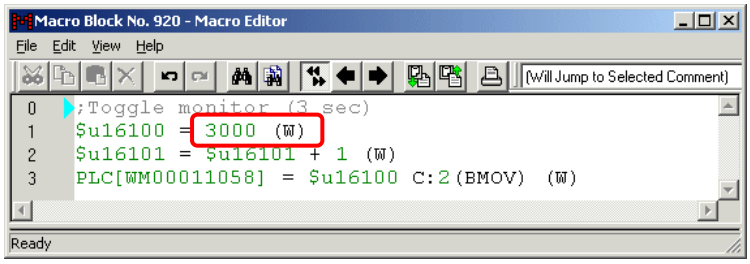
- Communication error between display unit and control unit

<Sample software for communication error detection>
Make the following settings on the screen editor.
Set the event timer macro on the [Macro setting] dialog in the [System setting].



Set the cycle time to “1 sec” and the macro No. to “920”.

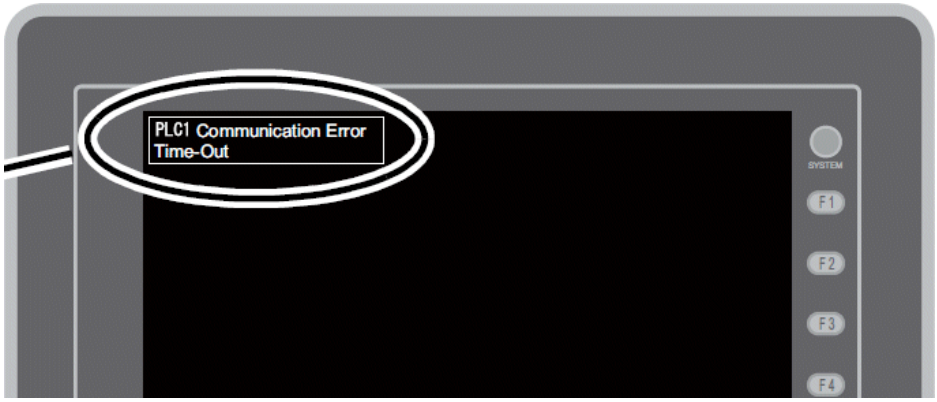
Create macro block 920.


Macro Block No. 920 - Macro Editor
File Edit View Help
(Will Jump to Selected Comment)
0 ;Toggle monitor (3 sec)
1 $u16100 = 3000 (W)
2 $u16101 = $u16101 + 1 (W)
3 PLC[WM00011058] = $u16100 C:2(BMOV) (W)
Ready

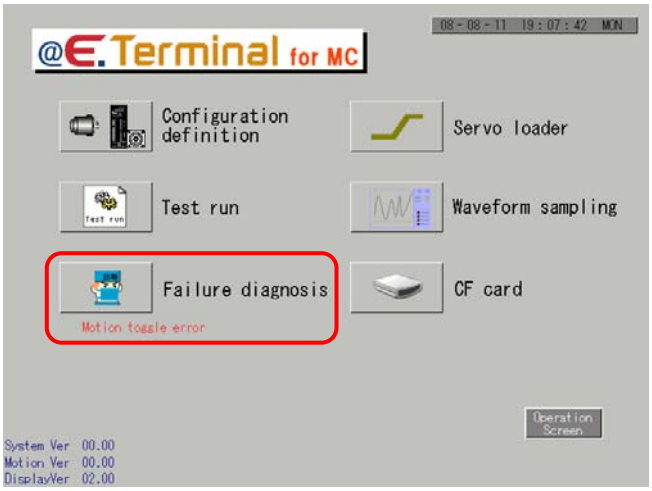
After completing the above settings, transfer the data to the display unit. If communication between the display unit and controller unit is not performed for three seconds, all the servo axes make emergency stops.

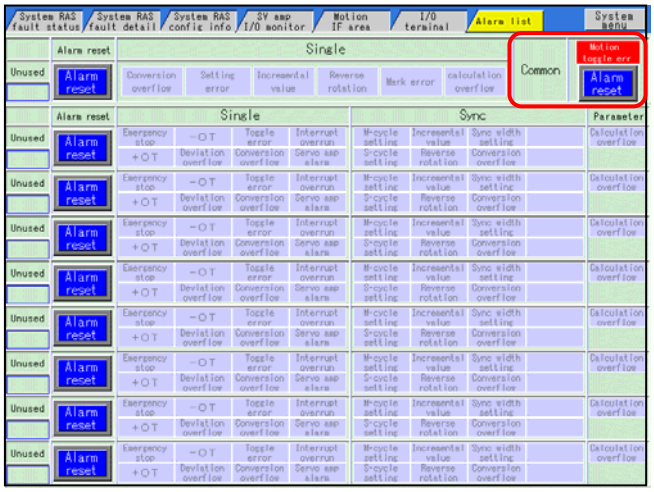
*Note: Depending on the screen data, the communication cycle of the display unit may become 3 seconds or more. In this case, make the monitoring time longer. (3000 in the second line = 3 seconds).

If a communication error is detected, an error message appears on the top left of the screen.

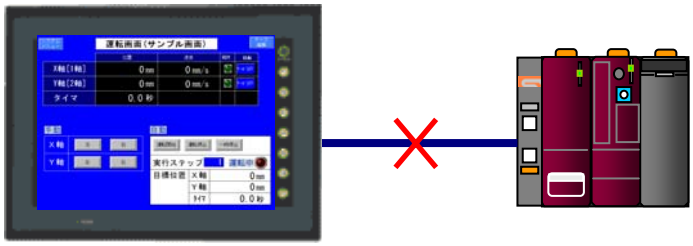


After recovering from the error, the following message appears on the menu screen. Reset it on the “Failure Diagnosis” screen.





- Communication error detection between display unit and PLC



A communication error can be detected by communicating with the system memory from the PLC in a given cycle. If the data in the @E.Terminal is not updated from the PLC for a given period of time, all the servo axes make emergency stops.

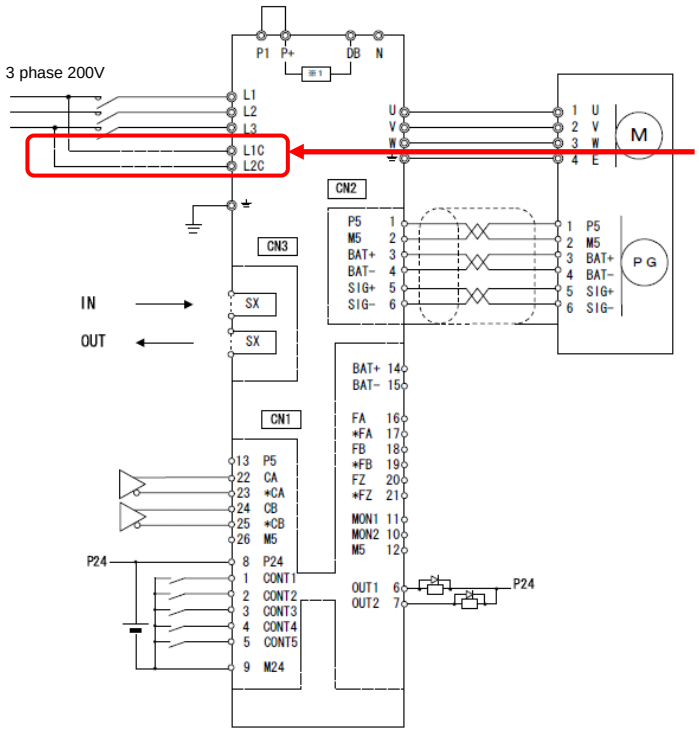
PLC to @E.Terminal

WM11054	Toggle error reset (for PLC)	1: Contents toggle error is reset
WM11055	Toggle error monitoring timer (ms) (for PLC)	A toggle error occurs if the contents toggle bit does not change for the period of time set here. Toggle is not monitored if set to 0. All the axes make emergency stops upon occurrence of an error.
WM11056	Contents toggle bit (for PLC)	Commands as follows: 0 → 1 → 2…..65534 → 65535 → 0 → 1

@E.Terminal to PLC

WM11028	Contents toggle error (for PLC)	1: Toggle error, 0: Reset

4) In case of FALDIC-α system, if @E.Terminal is powered on with the the servo amplifier powered off, it takes 30 seconds or more to start up (time required for CPU to start running).
To reduce the time, take the following measures on the servo amplifier.



Supply control power to L1C and L2C.

5) Multi-CPU system is not available.

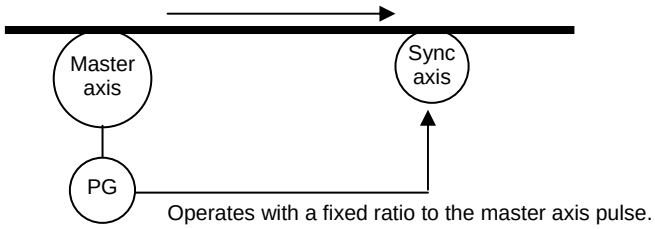
6) When encoder communication error occurs, it doesn't communicate between controller and servo in FALDIC-α.

7) If you add and start up the divice on degeneracy setting; such as servo or I/O terminal, the lack of the tact happens. And it occurs non fatal error of the contents detective error. Do not add and start up servo and I/O terminal.

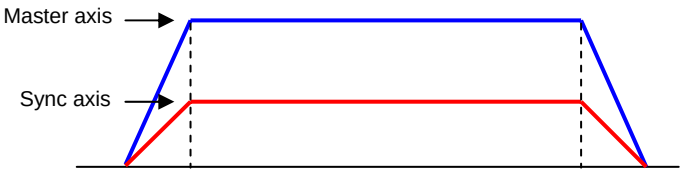
Section 2 Motion Function Description

2-1 Ratio Synchronous

The sync axis operates in synchronization with master axis pulse. Ratio synchronous is used for control of winding, etc.



Operates with a fixed ratio to the master axis pulse.



The speed same as or higher than the master axis can be set.

<Calculation of sync axis position>

Sync axis position = Master axis position × Ratio_Sync axis / Ratio_Master axis

<Operation>

- After “sync command” is set ON, the sync axis operates with respect to the master axis pulse.
- “Ratio_Master axis” and “Ratio_Sync axis” can be changed during synchronization.
- Synchronization in which the master axis reverses is also possible.
- Set “sync command” OFF to stop synchronization.

<Input interface>

Name	Size	Range	Description
Sync command	BOOL	0/1	While this parameter is ON, synchronization is performed.
Ratio_Master axis	DINT	1 to 2147483647	The synchronous ratio for the master axis is set. If set to 0, it is assumed to be 1 and operation is started.
Ratio_Sync axis	DINT	0 to 2147483647	Set the synchronous ratio for the sync axis.

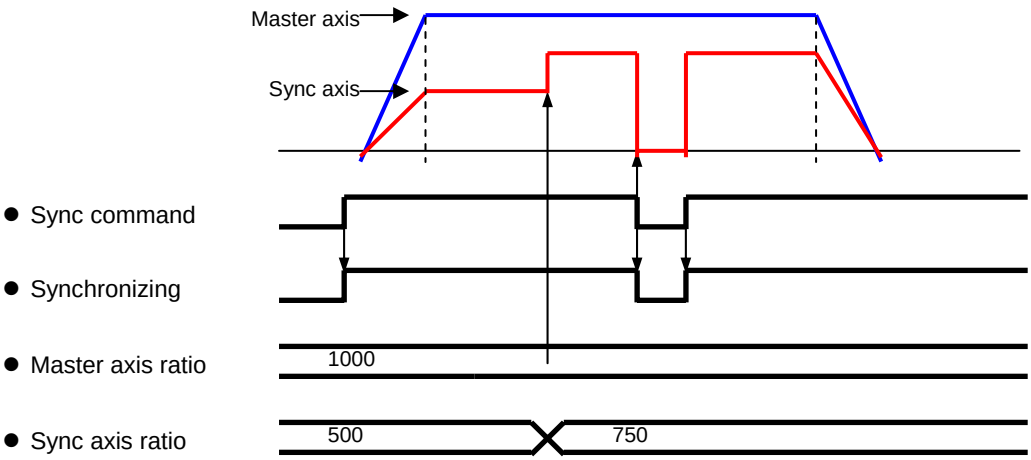
<Output interface>

Name	Size	Range	Description
Synchronizing	BOOL	0/1	This parameter is set ON when the sync command is set ON without errors.

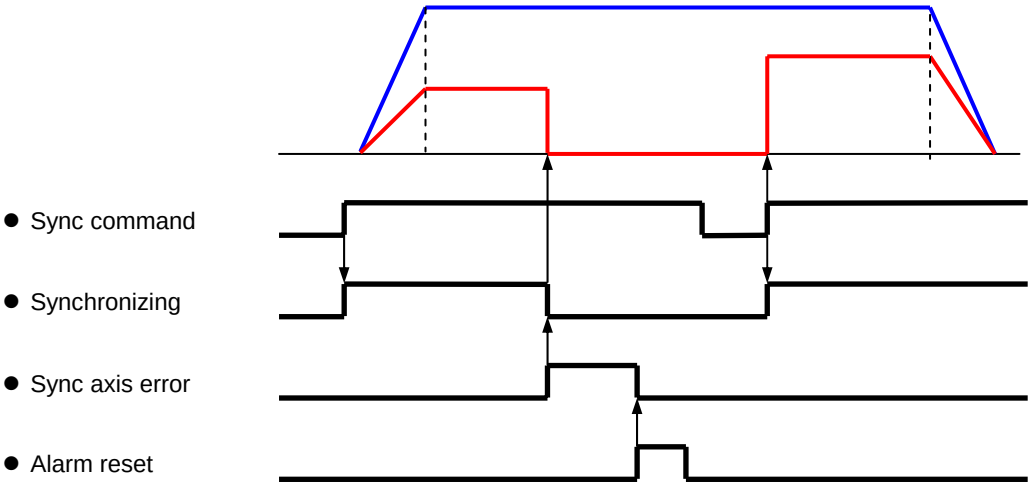
<Error>

Name	Size	Range	Description
Incremental value error	BOOL	0/1	An error occurs if the sync axis speed exceeds the max. velocity during synchronization. Recover from the error with the alarm reset.

<Operation example>



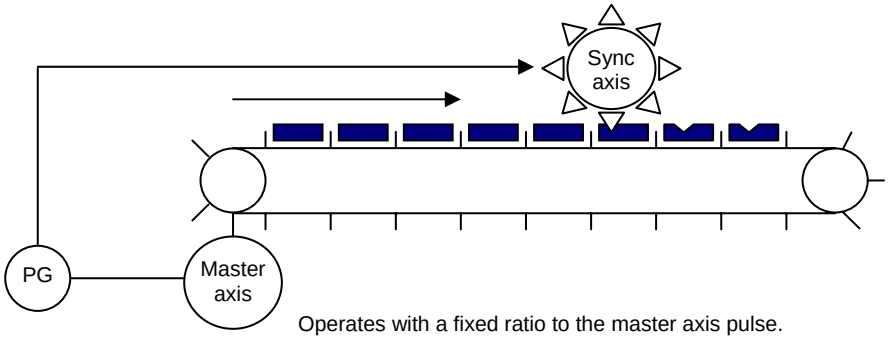
<Operation example Sync axis error>



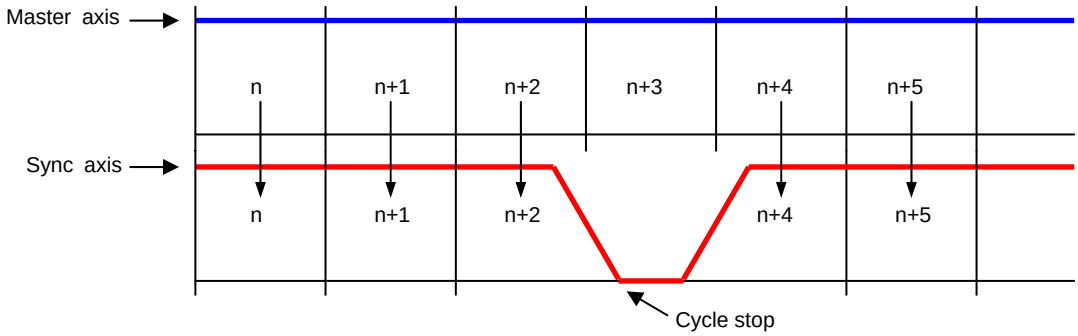
Section 2 Motion Function Description

2-2 Cycle Synchronous

The sync axis operates in synchronization with master axis pulse. Phases of the master axis and sync axis can be controlled; this is used for synchronous operations that require control of length per work.



Operates with a fixed ratio to the master axis pulse.



<Calculation of sync axis position>

Sync axis position = Master axis position × Sync axis travel per cycle / Master axis travel per cycle

<Operation>

- After “sync command” is set ON, the sync axis operates in synchronization with “master axis input pulse”.
- The sync axis can make a cycle stop.
- “Master axis travel per cycle” and “Sync axis travel per cycle” can be changed during synchronization. However, changes are reflected after the master axis cycle is completed.
- If an error such as “setting error” occurs during synchronization, synchronization stops. To restart synchronization, remove the cause of the error first. Then, set “alarm reset” ON and set “synchronous command” OFF and ON again.
- Set “sync command” OFF to stop synchronization.

<Input interface>

Name	Size	Range	Description
Sync command	BOOL	0/1	While this parameter is ON, synchronization is performed.
Cycle stop	BOOL	0/1	When this parameter is set ON, the sync axis stops at the reference position. When set OFF, operation is resumed while keeping the phase.
Sync axis travel per cycle	DINT	1 to 2147483647 [Unit amount of sync axis]	Set the travel amount of the sync axis during one cycle.
Master axis travel per cycle	DINT	1 to 2147483647 [Unit amount of master axis]	Set the travel amount of the master axis during one cycle.
Min. value of master axis travel per cycle	DINT	0 to 2147483647 [Unit amount of master axis]	Set the min. value of master axis travel per cycle. This parameter is used for error detection.
Min. value of sync axis travel per cycle	DINT	0 to 2147483647 [Unit amount of sync axis]	Set the min. value of sync axis travel per cycle. This parameter is used for error detection.
Reverse feed limiter	DINT	0 to 2147483647 [Unit amount of master axis]	Set the limit value for master axis reverse rotations. This parameter is used for error detection.
Travel at startup	DINT	0 to Master axis travel per cycle [Unit amount of master axis]	This function prevents the sync axis from overshooting if the sync command is set ON while the master axis is operating. Sin-curve acceleration is made. Set the travel amount after synchronization is started or cycle stop is reset.
Travel at stop	DINT	0 to Master axis travel per cycle [Unit amount of master axis]	This function prevents the sync axis from undershooting if the sync command is set OFF while the master axis is operating. Sin-curve deceleration is made. Set the travel amount after a cycle stop is made.
Delay at startup	DINT	0 to 2147483647 [Unit amount of master axis]	The sync axis starts operation after synchronization is started and then the master axis operates for the length set here.

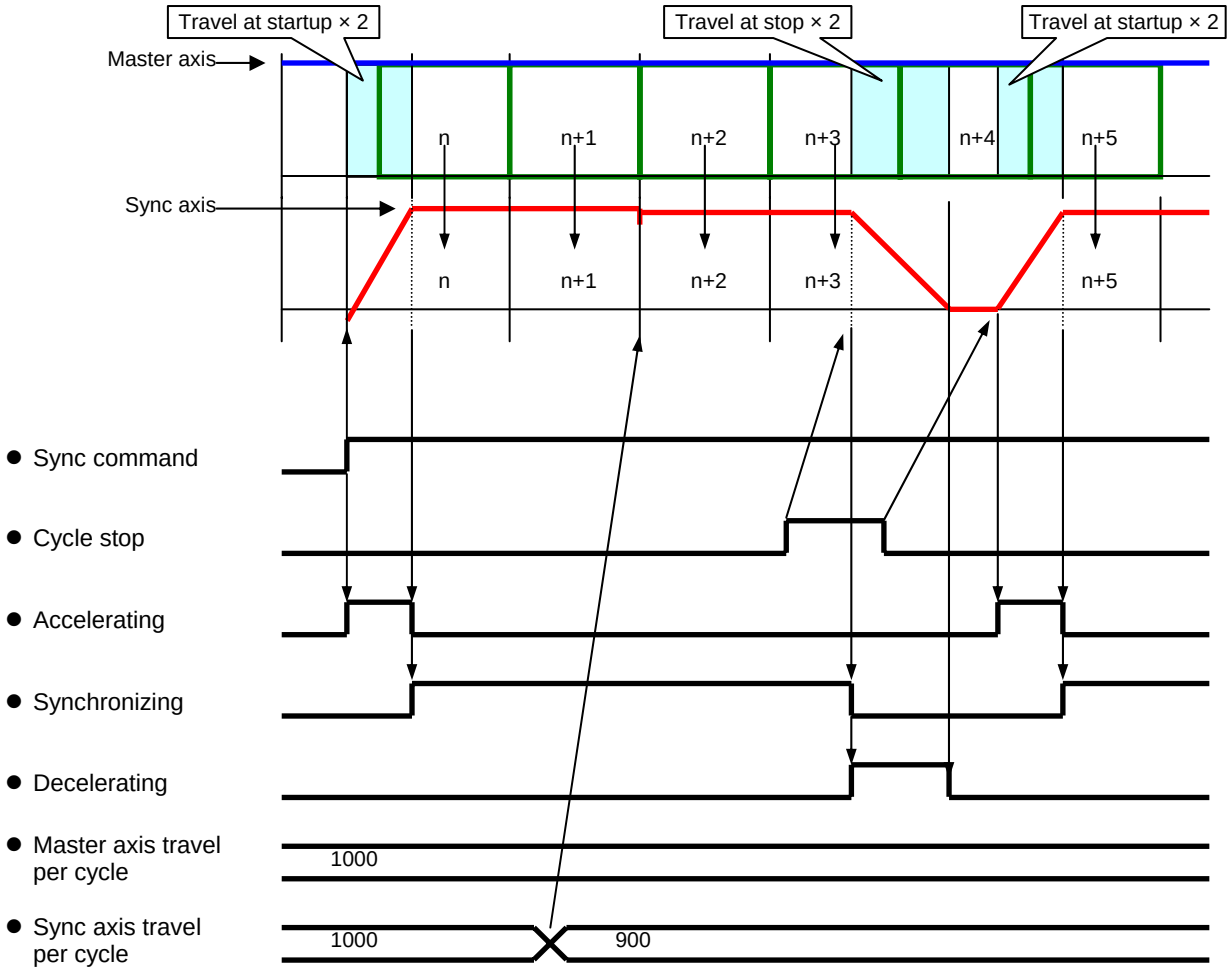
<Output interface>

Name	Size	Range	Description
Synchronizing	BOOL	0/1	This parameter is set ON during synchronization.
Accelerating	BOOL	0/1	This parameter is set ON while the sync axis is accelerating.
Decelerating	BOOL	0/1	This parameter is set ON while the sync axis is decelerating.

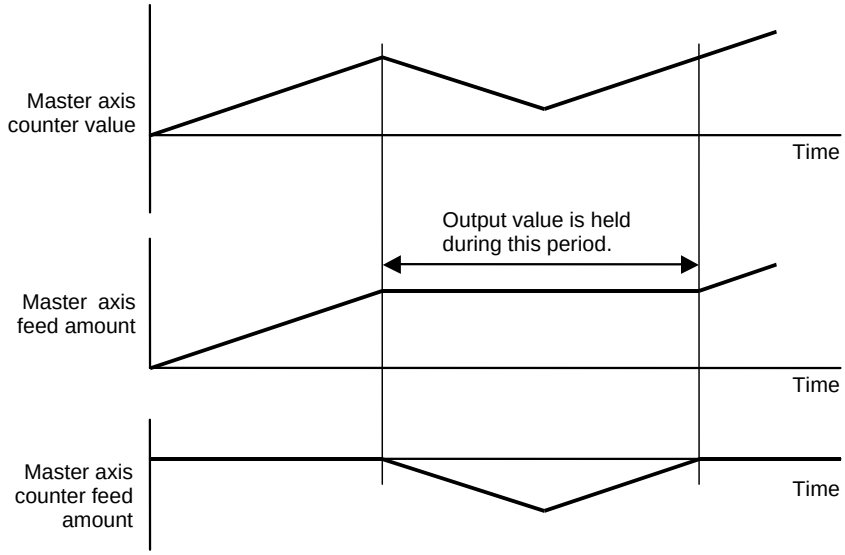
<Error>

Name	Size	Range	Description
Master axis cycle setting error	BOOL	0/1	This error occurs if “master axis travel per cycle is smaller than min. value of master axis travel per cycle.” Recover from the error with the alarm reset.
Sync axis cycle setting error	BOOL	0/1	This error occurs if “sync axis travel per cycle is smaller than min. value of sync axis travel per cycle.” Recover from the error with the alarm reset.
Incremental value error	BOOL	0/1	This error occurs if the incremental value of the master axis pulse input for one tact exceeds one-half of the master axis travel per cycle. This error also occurs if the sync axis speed exceeds the max. velocity during synchronous operation. Recover from the error with the alarm reset.
Reverse rotation error	BOOL	0/1	This error occurs if “master axis counter feed exceeds Reverse feed limiter. Recover from the error with the alarm reset.”

<Operation example Startup & Cycle stop>



<Operation example Master axis counter feed>

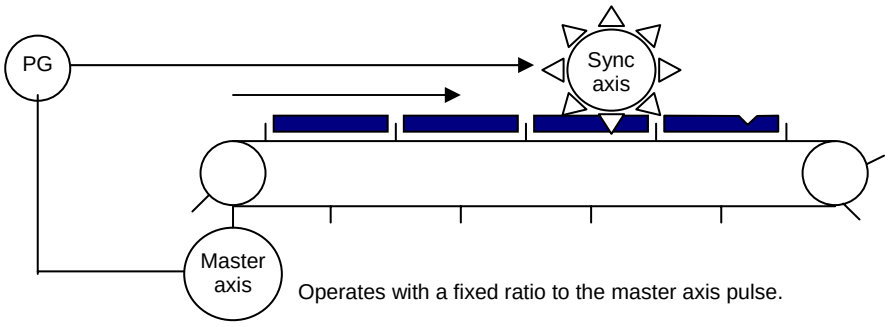


* Same as the rotary shear and flying shear.

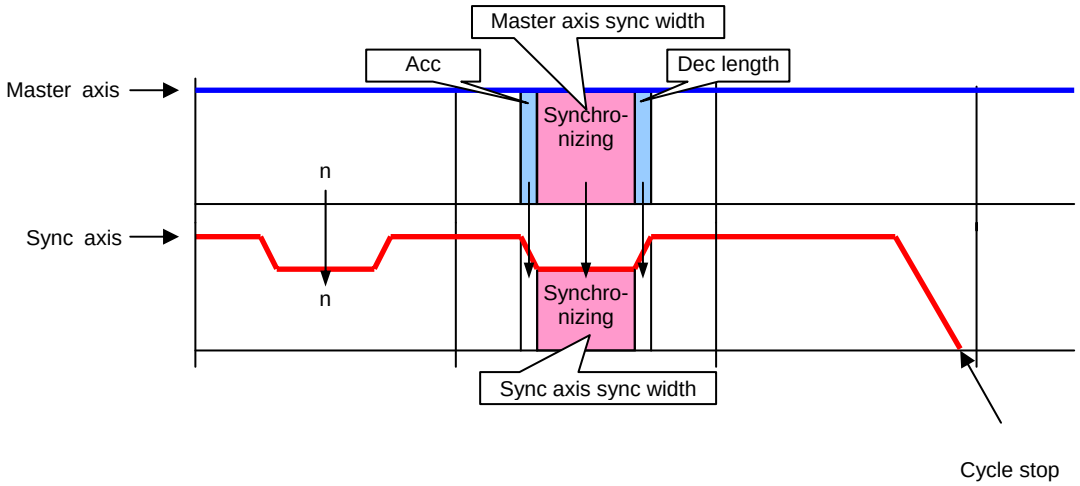
Section 2 Motion Function Description

2-3 Rotary Shear

The sync axis operates in synchronization with master axis pulse for a fixed section making rotary motion.
Phases of the master axis and sync axis can be controlled; this is used for synchronous operations that require control of length per work.
The difference from the cycle synchronous is that the sync width is determined within a cycle and the speed can be changed at other sections.
Even if the circumference of the sync axis (sync axis travel per cycle) is different from that of the master axis (master axis travel per cycle), control is also possible. This can be used for various types of work.



Operates with a fixed ratio to the master axis pulse.



<Operation>

- After “synchronous command” is set ON, the sync axis operates in synchronization with “master axis input pulse”.
- The sync axis can make a cycle stop.
- Parameters such as “Master axis travel per cycle” and “Sync axis travel per cycle” can be changed during synchronization. However, changes are reflected after the master axis cycle is completed.
- If an error such as “set value error” occurs during synchronization, synchronization stops.
- Set “sync command” OFF to stop synchronization.

<Input interface>

Name	Size	Range	Description
Sync command	BOOL	0/1	While this parameter is ON, synchronization is performed.
Cycle stop	BOOL	0/1	When this parameter is set ON, the sync axis stops at the reference position. When set OFF, operation is resumed while keeping the phase.
Sync axis travel per cycle	DINT	1 to 2147483647 [Unit amount of sync axis]	Set the travel amount of the sync axis during one cycle. In this mechanism, set the cutter perimeter.
Master axis travel per cycle	DINT	1 to 2147483647 [Unit amount of master axis]	Set the travel amount of the master axis during one cycle. In this mechanism, set the cut length of the work.
Min. value of master axis travel per cycle	DINT	0 to 2147483647 [Unit amount of master axis]	Set the min. value of master axis travel per cycle. This parameter is used for error detection.
Reverse feed limiter	DINT	0 to 2147483647 [Unit amount of master axis]	Set the limit value for master axis reverse rotations. This parameter is used for error detection.
Travel at startup	DINT	0 to Master axis travel per cycle [Unit amount of master axis]	This function prevents the sync axis from overshooting if the sync command is set ON while the master axis is operating. Sin-curve acceleration is made. Set the travel amount after synchronization is started or cycle stop is reset.
Travel at stop	DINT	0 to Master axis travel per cycle [Unit amount of master axis]	This function prevents the sync axis from undershooting if the sync command is set OFF while the master axis is operating. Sin-curve deceleration is made. Set the travel amount after a cycle stop is made.
Master axis sync width	DINT	0 to Master axis travel per cycle [Unit amount of master axis]	Set the length in which the master axis synchronizes with the sync axis. In this section, the work is cut.
Sync axis sync width	DINT	0 to 2147483647 [Unit amount of sync axis]	Set the length in which the sync axis synchronizes with the master axis. In this section, the work is cut.
Acceleration length	DINT	0 to 2147483647 [Unit amount of master axis]	Set the master axis travel amount during acceleration (or deceleration) made in the transition between sync and async.
Deceleration length	DINT	0 to 2147483647 [Unit amount of master axis]	Set the master axis travel amount during acceleration (or deceleration) made in the transition between sync and async.
Delay at startup	DINT	0 to 2147483647 [Unit amount of master axis]	The sync axis starts operation after synchronization is started and then the master axis operates for the length set here.

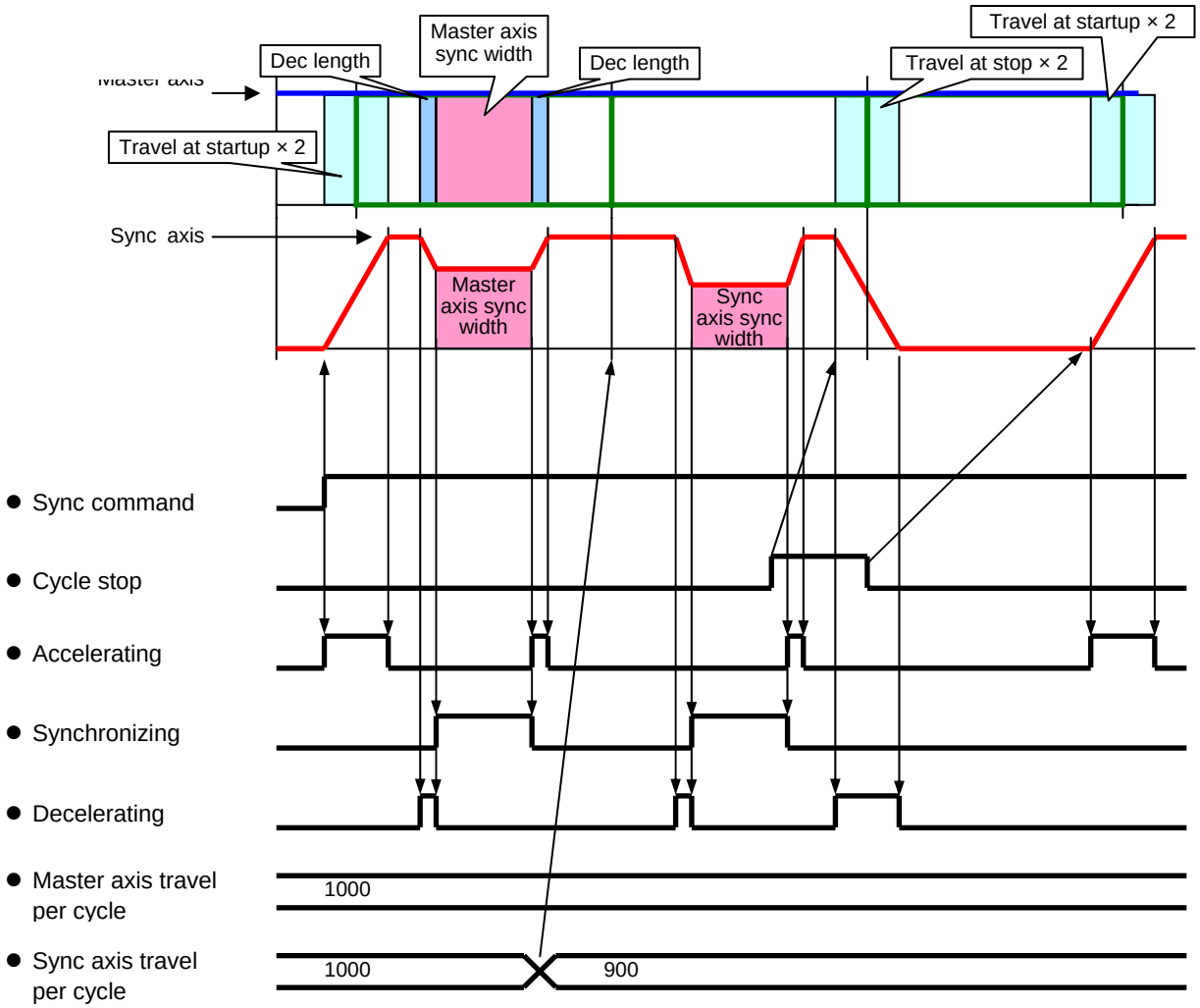
<Output interface>

Name	Size	Range	Description
Synchronizing	BOOL	0/1	This parameter is set ON during synchronization.
Accelerating	BOOL	0/1	This parameter is set ON while the sync axis is accelerating.
Decelerating	BOOL	0/1	This parameter is set ON while the sync axis is decelerating.

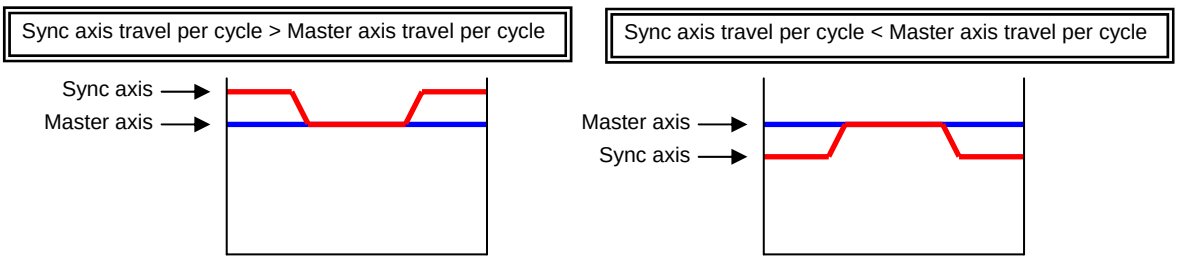
<Error>

Name	Size	Range	Description
Master axis cycle setting error	BOOL	0/1	This error occurs if “master axis travel per cycle” is smaller than “min. value of master axis travel per cycle”. Recover from the error with the alarm reset.
Incremental value error	BOOL	0/1	This error occurs if the incremental value of the master axis pulse input for one tact exceeds one-half of the cut length, or if the sync axis speed exceeds the max. velocity during synchronous operation. Recover from the error with the alarm reset.
Reverse rotation error	BOOL	0/1	This error occurs if “master axis counter feed” exceeds “Reverse feed limiter”. Recover from the error with the alarm reset.
Sync axis width setting error	BOOL	0/1	This error occurs under the following conditions: Master axis sync width + Acc length + Dec length >= Master axis travel per cycle Or, Sync axis sync width > Sync axis travel per cycle Or, Master axis sync width × 2 + Acc length + Dec length $> \frac{\text{Master axis sync width}}{\text{Sync axis sync width}} \times 2 \times \text{Sync axis travel per cycle}$ Recover from the error with the alarm reset.

<Operation example Startup & Cycle stop>



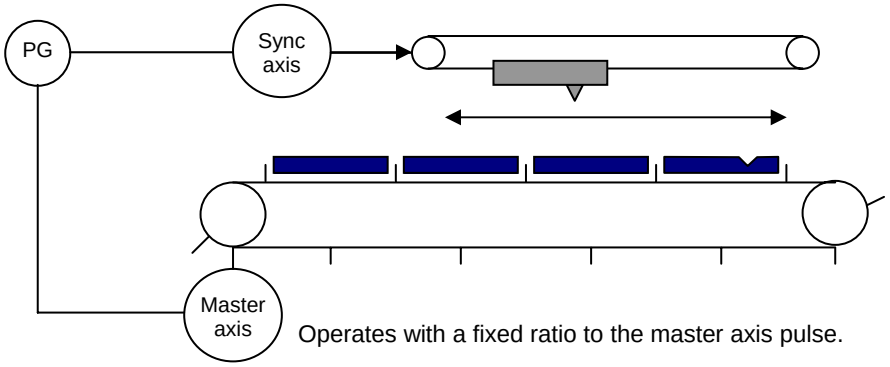
<Differences in synchronous operation depending on the difference between master axis travel per cycle and sync axis travel per cycle>


Sync axis travel per cycle > Master axis travel per cycle
Sync axis
Master axis
Sync axis travel per cycle < Master axis travel per cycle
Master axis
Sync axis

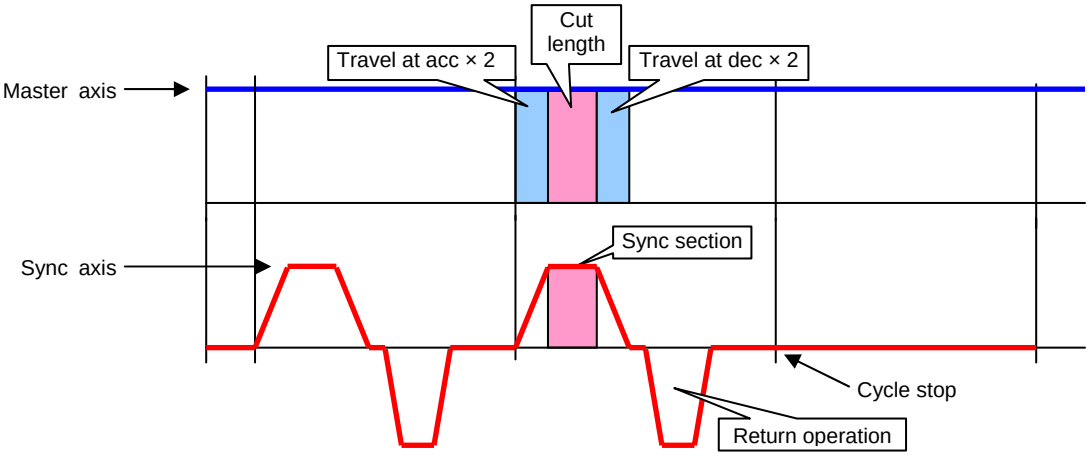
* When “sync axis travel per cycle” equals “master axis travel per cycle”, the master axis and sync axis operate at the same speed.

2-4 Flying Shear

The sync axis operates in synchronization with master axis pulse for a fixed section making reciprocating motion.
After synchronization is completed, the sync axis returns to the initial position and waits for the next cycle.



Operates with a fixed ratio to the master axis pulse.



<Operation>

- After “synchronous command” is set ON, the sync axis operates in synchronization with “master axis input pulse”. After synchronization is completed, the sync axis performs return operation for the length it has traveled.
- The sync axis can make a cycle stop.
- Parameters such as “Master axis travel per cycle” and “Sync axis sync width” can be changed during synchronization. However, changes are reflected after the master axis cycle is completed.
- If an error such as “sync width setting error” occurs during synchronization, synchronization stops.
- Set “synchronous command” OFF to stop synchronization.
- There are the following two timings for the start of the next cycle:
  Mark detection disabled: If the master axis has operated for the length set in “master axis travel per cycle”, the next cycle automatically starts.
  Mark detection enabled: Even if a cycle has been completed, the next cycle does not start until the mark signal is set ON.

<Input interface>

Name	Size	Range	Description
Sync command	BOOL	0/1	While this parameter is ON, synchronization is performed.
Cycle stop	BOOL	0/1	When this parameter is set ON, the sync axis stops at the reference position. When set OFF, operation is resumed while keeping the phase.
Master axis travel per cycle	DINT	1 to 2147483647 [Unit amount of master axis]	Set the travel amount of the master axis during one cycle. In this mechanism, set the cut length of the work.
Min. value of master axis travel per cycle	DINT	0 to 2147483647 [Unit amount of master axis]	Set the min. value of master axis travel per cycle. This parameter is used for error detection.
Reverse feed limiter	DINT	0 to 2147483647 [Unit amount of master axis]	Set the limit value for master axis reverse rotations. This parameter is used for error detection.
Travel at startup	DINT	0 to 2147483647 [Unit amount of master axis]	Set the master axis travel amount while the sync axis is accelerating.
Travel at stop	DINT	0 to 2147483647 [Unit amount of master axis]	Set the master axis travel amount while the sync axis is decelerating.
Master axis sync width	DINT	0 to 2147483647 [Unit amount of master axis]	Set the length in which the master axis synchronizes with the sync axis. In this section, the work is cut.
Sync axis sync width	DINT	0 to 2147483647 [Unit amount of sync axis]	Set the length in which the sync axis synchronizes with the master axis. In this section, the work is cut.
Cut command delay	DINT	0 to 2147483647 [ms]	Set the value of cut output delay time. *
Cut command time	DINT	0 to 2147483647 [ms]	Set the value of cut output ON time. *
Home position return speed	DINT	0 to 2147483647 [Unit amount of sync axis]	Set the speed of return operation.
Delay at startup	DINT	0 to Master axis travel per cycle [Unit amount of master axis]	The sync axis starts operation after synchronization is started and then the master axis operates for the length set here.

* Minimum unit is 1 takt (5ms).
Actual Cut command time becomes maximum 5ms longer than setting time.
Actual Cut command delay becomes maximum 4ms shorter than setting time.

<Output interface>

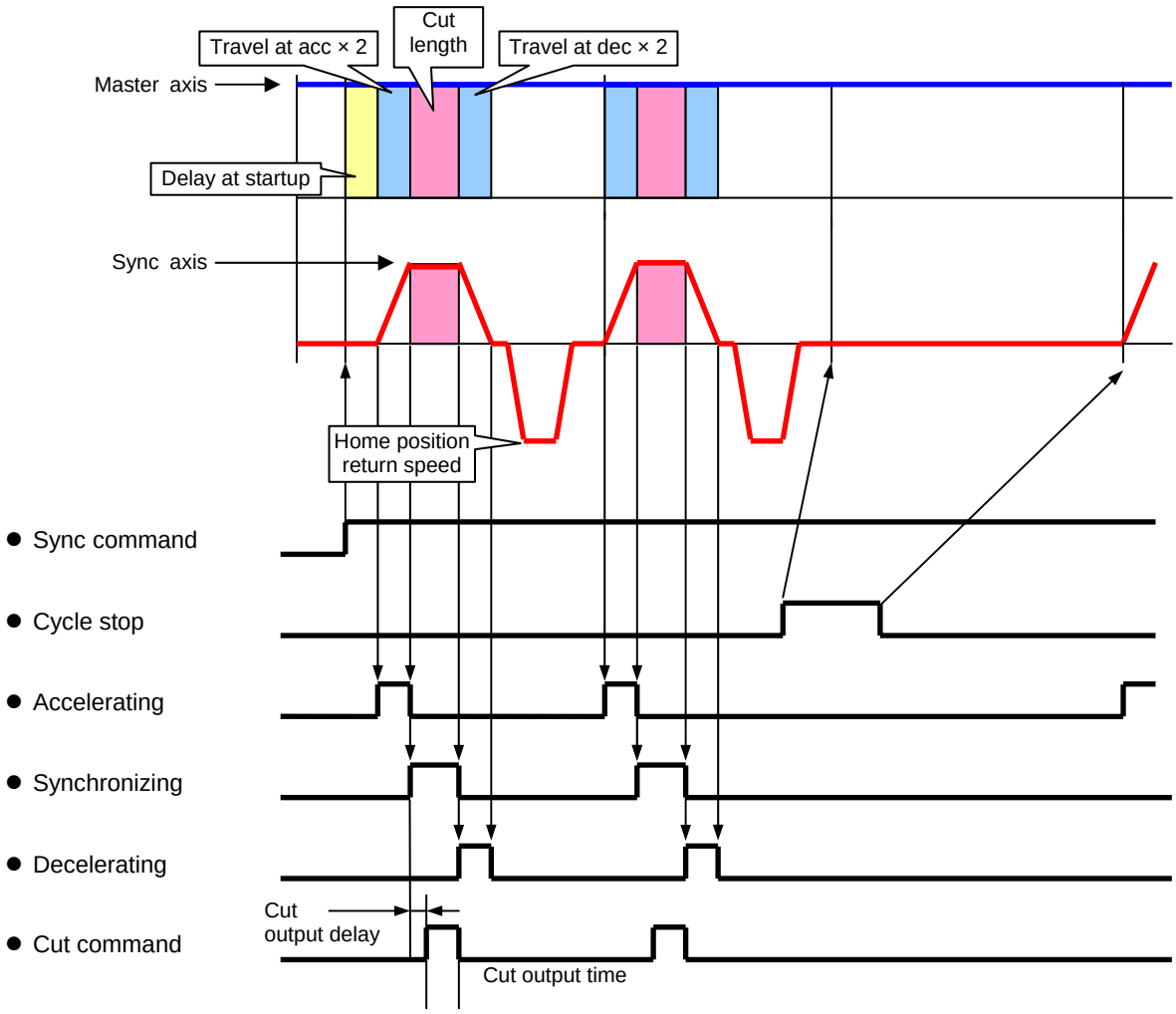
Name	Size	Range	Description
Synchronizing	BOOL	0/1	This parameter is set ON during synchronization.
Accelerating	BOOL	0/1	This parameter is set ON while the sync axis is accelerating.
Decelerating	BOOL	0/1	This parameter is set ON while the sync axis is decelerating.
Cut command	BOOL	0/1	After synchronous operation is completed, this is set ON for set the period of time.

<Error>

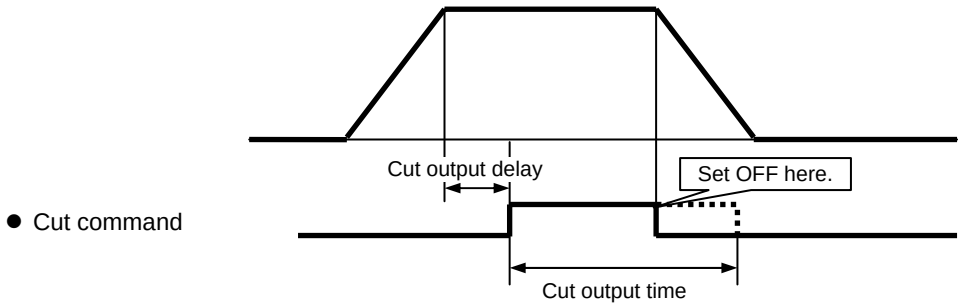
Name	Size	Range	Description
Master axis cycle setting error	BOOL	0/1	This error occurs if “master axis travel per cycle” is smaller than “min. value of master axis travel per cycle”, or an attempt is made to start the next cycle during synchronous operation (incl. return operation).
Incremental value error	BOOL	0/1	This error occurs if the incremental value of the master axis pulse input for one tact exceeds one-half of the cut length, or if the sync axis speed exceeds the max. velocity during synchronous operation. Recover from the error with the alarm reset.

Name	Size	Range	Description
Reverse rotation error	BOOL	0/1	This error occurs if “master axis counter feed” exceeds “Reverse feed limiter”. Recover from the error with the alarm reset.
Sync axis width setting error	BOOL	0/1	This error occurs under the following condition: “Master axis sync width” + “Travel at startup” × 2 + “Travel at stop” × 2 >= “Master axis travel per cycle” Recover from the error with the alarm reset.

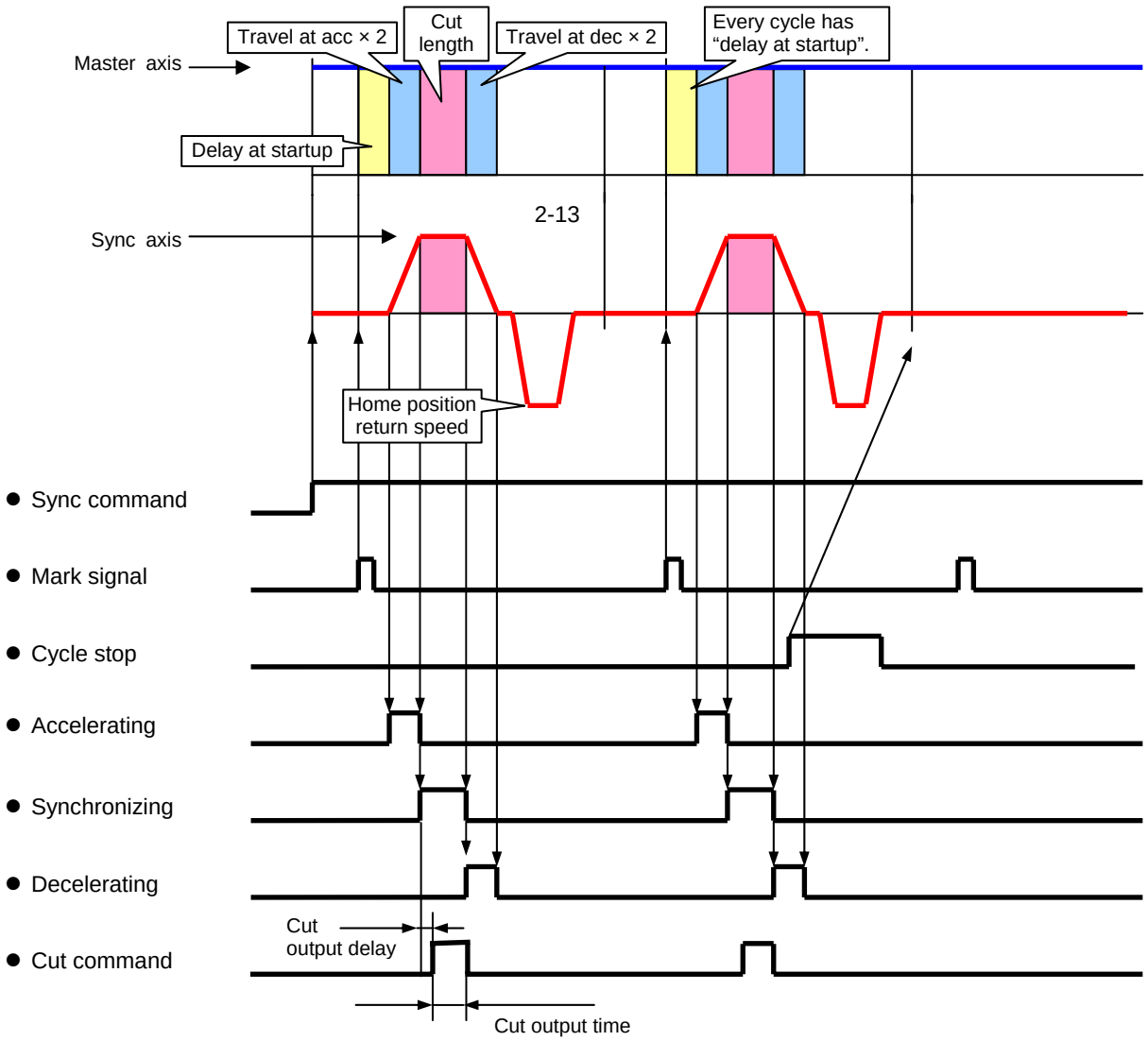
<Operation example Startup & Cycle stop (mark disabled)>



<When the cut command time is longer than the sync time>

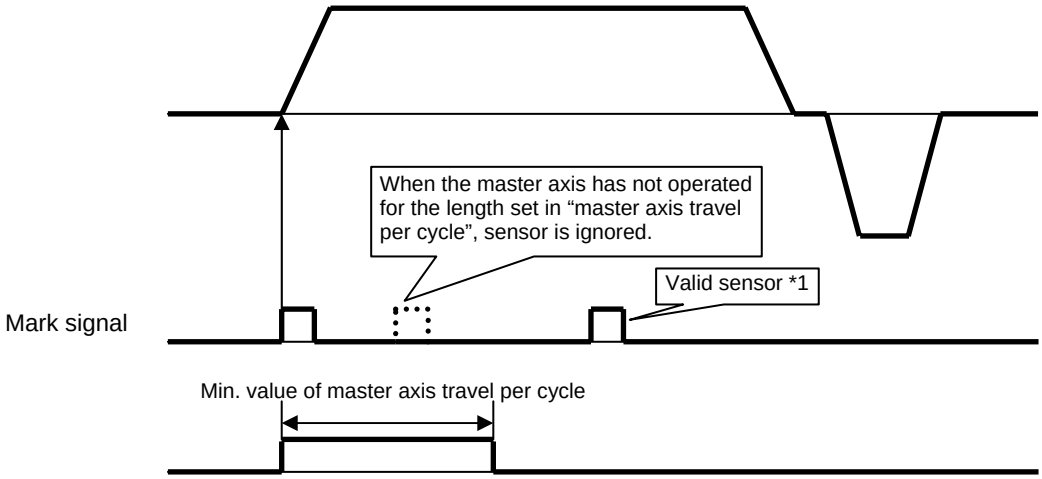


<Operation example Startup & Cycle stop (mark enabled)>



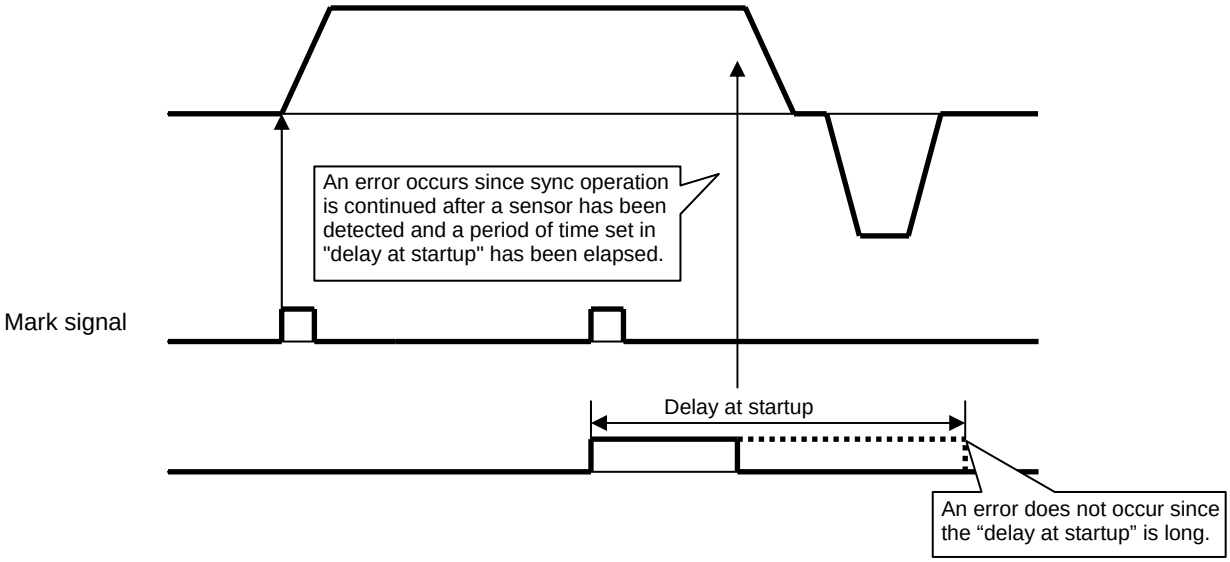
<Details of main parameters>

- **Min. value of master axis travel per cycle**
  Set the minimum value of “master axis travel per cycle”.
  This parameter is also used for a mask of the mark sensor when mark detection is performed.


When the master axis has not operated for the length set in “master axis travel per cycle”, sensor is ignored.
Valid sensor *1
Mark signal
Min. value of master axis travel per cycle

*This is a valid sensor, however an error occurs since it is set ON during operation.
If the delay at startup is long, an error does not occur.

- **Master axis cycle setting error**
  If an attempt is made to start the next cycle during synchronous operation, an error occurs as follows.


An error occurs since sync operation is continued after a sensor has been detected and a period of time set in "delay at startup" has been elapsed.
Mark signal
Delay at startup
An error does not occur since the “delay at startup” is long.

3-1 Memory Map Outline

The memory map of the controller unit is divided into @E.Terminal area and user area as shown below.
Users can use the user area freely.
Motion control is exercised by accessing the @E.Terminal area.

Standard memory (Non-retained) 64kW	WM0 to WM9999	%MW1.0 to %MW1.9999	User area Approx. 10Kw
	WM10000 to WM30719	%MW1.10000 to %MW1.30719	@E.Terminal area Approx. 20Kw
	WM30720 to WM65535	%MW1.30720 to %MW1.65535	User area 34Kw
Retain memory 22kW	WL0 to WL9999	%MW3.0 to %MW3.9999	User area Approx. 10Kw
	WL10000 to WL20479	%MW3.10000 to %MW3.20479	@E.Terminal area Approx. 10Kw
	WL20480 to WL22527	%MW3.20479 to %MW3.22527	User area 2Kw
User FB memory 4kW			
System FB memory 6kW			

@E.Terminal area is divided as follows.

◆ Standard memory

1) General-purpose interface area : This area performs manual operation, homing, PTP operation or sync command. Change is updated in real time.

2) System area : This area is an interface area with motion control part. (processing time, etc.) Change is updated in real time.

◆ Retain memory

1) Parameter area (not open to the public) : This area is a data setting area such as mechanism configuration that is not changed during operation.

2) Data interface area : This area is a parameter area for acceleration/deceleration data or sync-related data. Change is updated in real time.

3-2 General-purpose Interface Area

<Outline>

[When using SX-Programmer Standard]

Address	Size	Name
WM10000 to WM10049	50W	External/Virtual master axis
WM10050 to WM10099	50W	Axis 1
WM10100 to WM10149	50W	Axis 2
WM10150 to WM10199	50W	Axis 3
WM10200 to WM10249	50W	Axis 4
WM10250 to WM10299	50W	Axis 5
WM10300 to WM10349	50W	Axis 6
WM10350 to WM10399	50W	Axis 7
WM10400 to WM10449	50W	Axis 8

[When using SX-Programmer Expert (D300win)]

Address	Size	Name
%MW1.10000 to %MW1.10049	50W	External/Virtual master axis
%MW1.10050 to %MW1.10099	50W	Axis 1
%MW1.10100 to %MW1.10149	50W	Axis 2
%MW1.10150 to %MW1.10199	50W	Axis 3
%MW1.10200 to %MW1.10249	50W	Axis 4
%MW1.10250 to %MW1.10299	50W	Axis 5
%MW1.10300 to %MW1.10349	50W	Axis 6
%MW1.10350 to %MW1.10399	50W	Axis 7
%MW1.10400 to %MW1.10449	50W	Axis 8

<Details>

● **External/Virtual master axis**

	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	
+0	Position data (lower) [unit amount/pulse] - Virtual/External common																Motion ↓ Controller
+1	Position data (upper) [unit amount/pulse] - Virtual/External common																
+2	Speed data [unit amount/unit speed] (lower) - Virtual/External common																
+3	Speed data [unit amount/unit speed] (upper) - Virtual/External common																
+4	Alarm status																
+5																	
+6	Virtual M axis running	Virtual M axis acc	Virtual M axis dec				Ext. PG selection	Virtual M axis selection									
+7	Synchro-nizing	Sync accelerat-ing	Sync decelerat-ing	Data read complete	Making cycle stop	Mark detection			Setting error		Incremental value error	Reverse rotation error	Mark error				
+8									Mechanical calculation overflow								
+9														Unit. conv. overflow (sync)		Error Summary	
+10	Target speed [unit amount/unit speed] (lower)																Controller ↓ Motion
+11	Target speed [unit amount/unit speed] (upper)																
+12																	
+13																	
+14																	
+15																	
+16	Sync cycle start	Virtual M axis run	Ext. pulse input inhibit					Alarm reset	Virtual M axis emer. stop							Current pos. pulse display	
+17		Cycle stop							Mark length measure start								
+18																	
+19	Data IF display edit inhibit	Data IF read inhibit															

● **Motion axis**

	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	
+0	Feedback position (lower) [unit amount]																Motion ↓ Controller
+1	Feedback position (upper) [unit amount]																
+2	Feedback speed [unit amount/s] (lower)/Parameter read value (lower)																
+3	Feedback speed [unit amount/s] (upper)/Parameter read value (upper)																
+4	Alarm status																
+5	FALDIC external counter																
+6	RDY	Positioning completion PSET	Homing completion			Interpolat-ing			Emer. stop detection	+OT	-OT	Deviation error	Toggle error	Unit. conv. overflow (PTP)	Interrupt overrun	FALDIC alarm detection	
+7	Synchro-nizing	Sync accelerat-ing	Sync decelerat-ing	Data read completion	Making cycle stop	Cut output	Compen-sating phase	Continue accepted	Master axis cycle set error	Sync axis cycle set error	Incremental length error	Reverse rotation error		Sync width setting error			
+8	SV para write completion	SV para read completion	SV parameter write error	SV parameter read error				SV para mode response	Mechanical calculation overflow								
+9														Unit. conv. overflow (Sync)		Error Summary	
+10	Target position (lower)/Write parameter setting (lower)																Controller ↓ Motion
+11	Target position (upper)/Write parameter setting (upper)																
+12	Feedback speed [unit amount/unit speed] (lower)/Parameter No.																
+13	Feedback speed [unit amount/unit speed] (upper)																
+14	Preset data (lower) [unit amount]																
+15	Preset data (upper) [unit amount]																
+16	Servo ON	Manual forward rotation	Manual reverse rotation	Homing command	PTP command	PTP ABS	Preset	Alarm reset	Emergency stop	Positioning cancel	Suspend	Deviation clear				Current pos. pulse display	
+17	Sync command	Cycle stop	Mark detection selection			2-axis linear interpolation command	Interrupt positioning	Continue mode		Phase compen-sation							
+18	SV para write command	SV para read command						SV parameter mode									
+19	Data IF display edit disable	Data IF read inhibit															

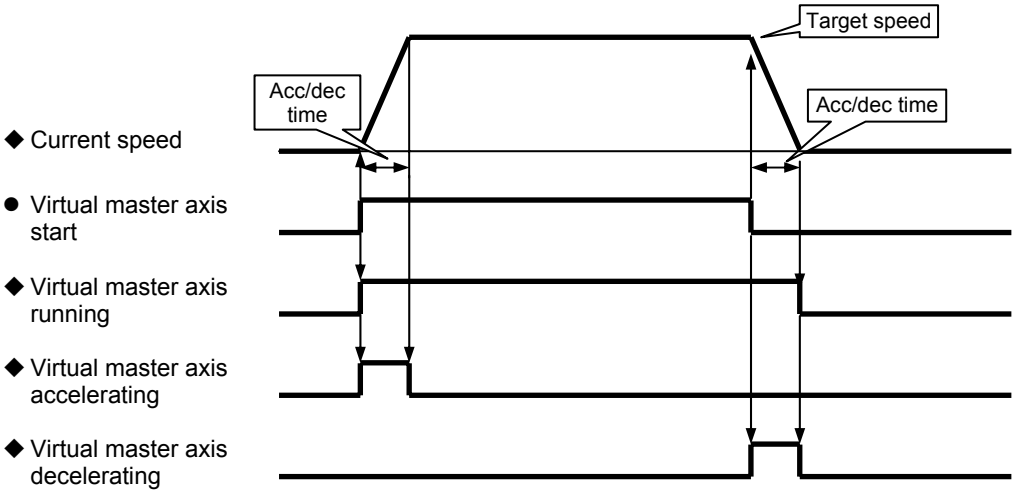
3-2-1 External/Virtual master axis Bit area [Controller → Motion]

(1) Sync cycle start (+16 Fbit)

When this signal is set ON, cycle control of the master axis is started.
When this signal is set OFF, synchronization without cycle control is performed.

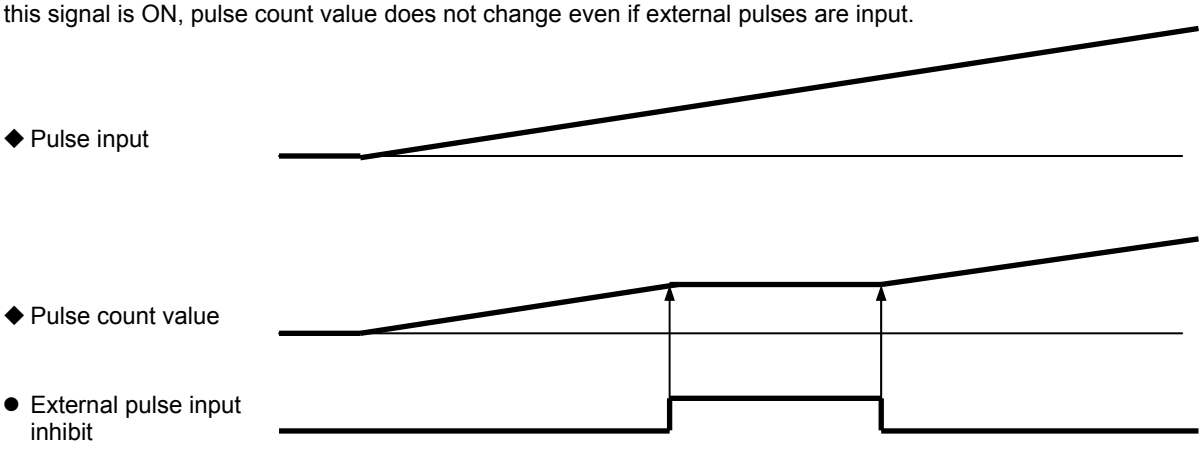
(2) Virtual master axis run (+16 Ebit)

While this signal is ON, the virtual master axis operates. When this signal is set OFF, it stops. Set the speed in the [Target speed]. It is possible to perform motion operation using position data of the virtual master axis as a master axis.



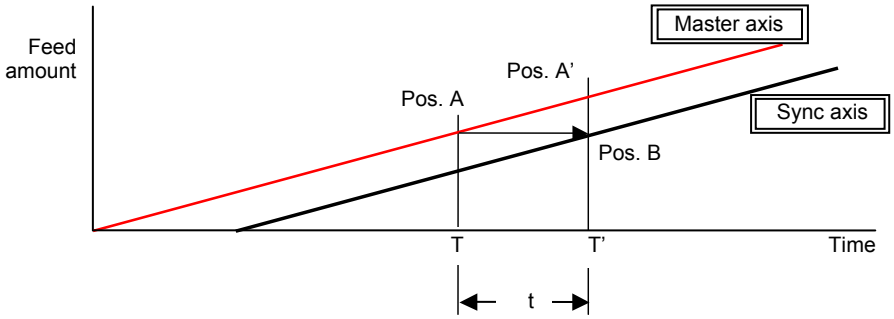
(3) External pulse input inhibit (+16 Dbit)

While this signal is ON, pulse count value does not change even if external pulses are input.



In the case of external pulses, an encoder that is connected to the servo amplifier of axis 1 becomes the master axis. The max. frequency for FALDIC-α is 500kHz (differential input) and that for ALPHA5 is 1MHz (differential input) or 200kHz (open collector).

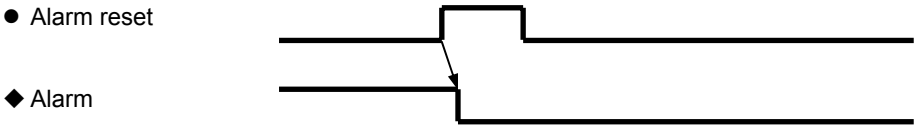
Master axis prediction is executed based on measured counter value, and output to position data.



- Pos. A of the master axis feed position for time T is measured.
- Pos. B of sync axis position corresponding to Pos. A of master axis position is calculated and then the current value is calculated.
- At the point of time T' when the sync axis reaches Pos. B with the motor rotating, the master axis has reached Pos. A. ("Delay time t" is caused by controller computing time, amplifier computing time, or rotations of a slave axis motor.)

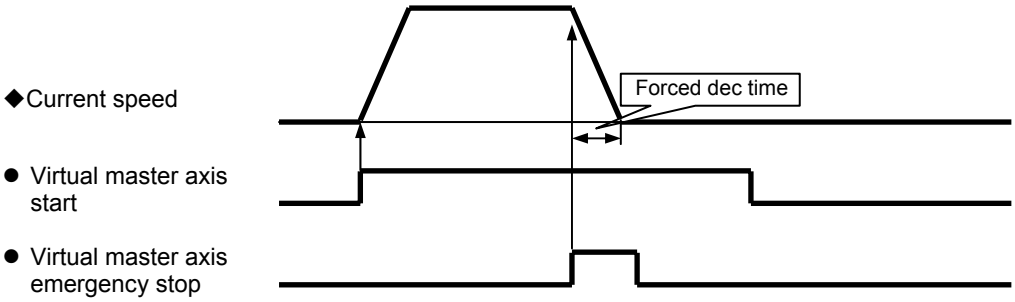
(4) Alarm reset (+16 8bit)

At the rising edge of this signal, a generated alarm is reset.



(5) Virtual master axis emergency stop (+16 7bit)

This signal forcefully stops the master axis. Emergency stop is different in deceleration time from normal stop.



(6) Current position pulse display (+16 0bit)

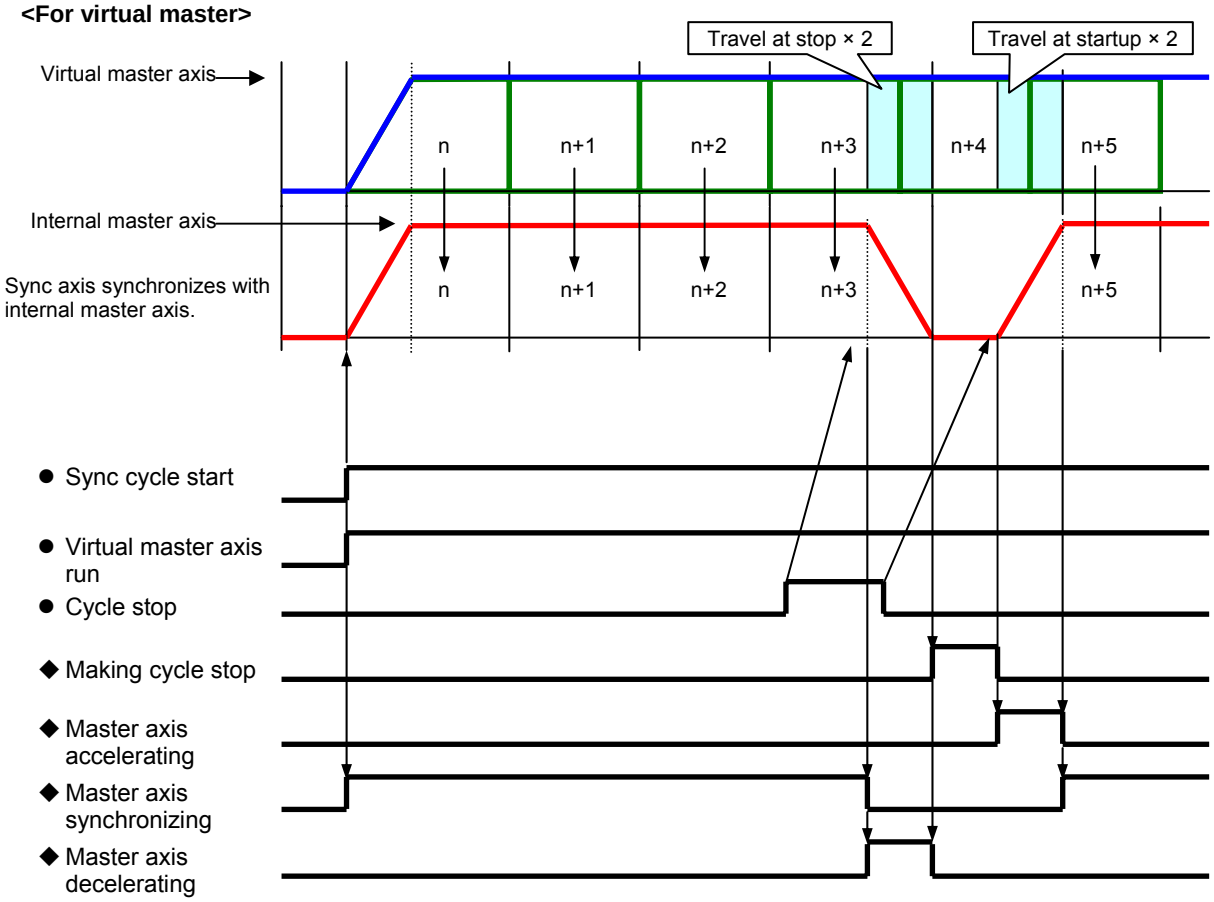
When this signal is set ON, the current position (Motion → Controller Data area +0, +1) is displayed in pulse number and the current speed (Motion → Controller Data area +2, +3) in r/min.
When set OFF, a value after pulse correction is displayed in the current position/current speed.
This signal is used to monitor pulse control values that are internally used.

(7) Cycle stop (+17 Ebit)

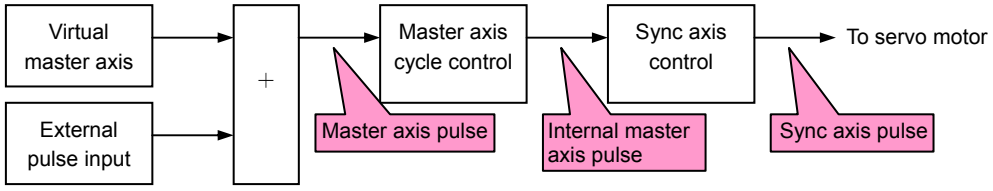
While this signal is ON, the master axis (for virtual master axis/external pulse) makes a cycle stop. When set OFF, operation is resumed. During cycle stop, [Making cycle stop] is set ON. The sync axis stops due to master axis stop.
If [Cycle stop] is set ON at startup, the master axis is instantly placed in a cycle stop state.
In cycle stop operation, the master axis stops at the position where [Master axis cycle setting] feed is completed.
Cycle stop cannot made in ratio synchronous.

* "Master axis stop" means that the master axis stops in the controller. Even if the actual master axis is operating with external pulses input, it is assumed that the master axis in the controller unit has stopped.

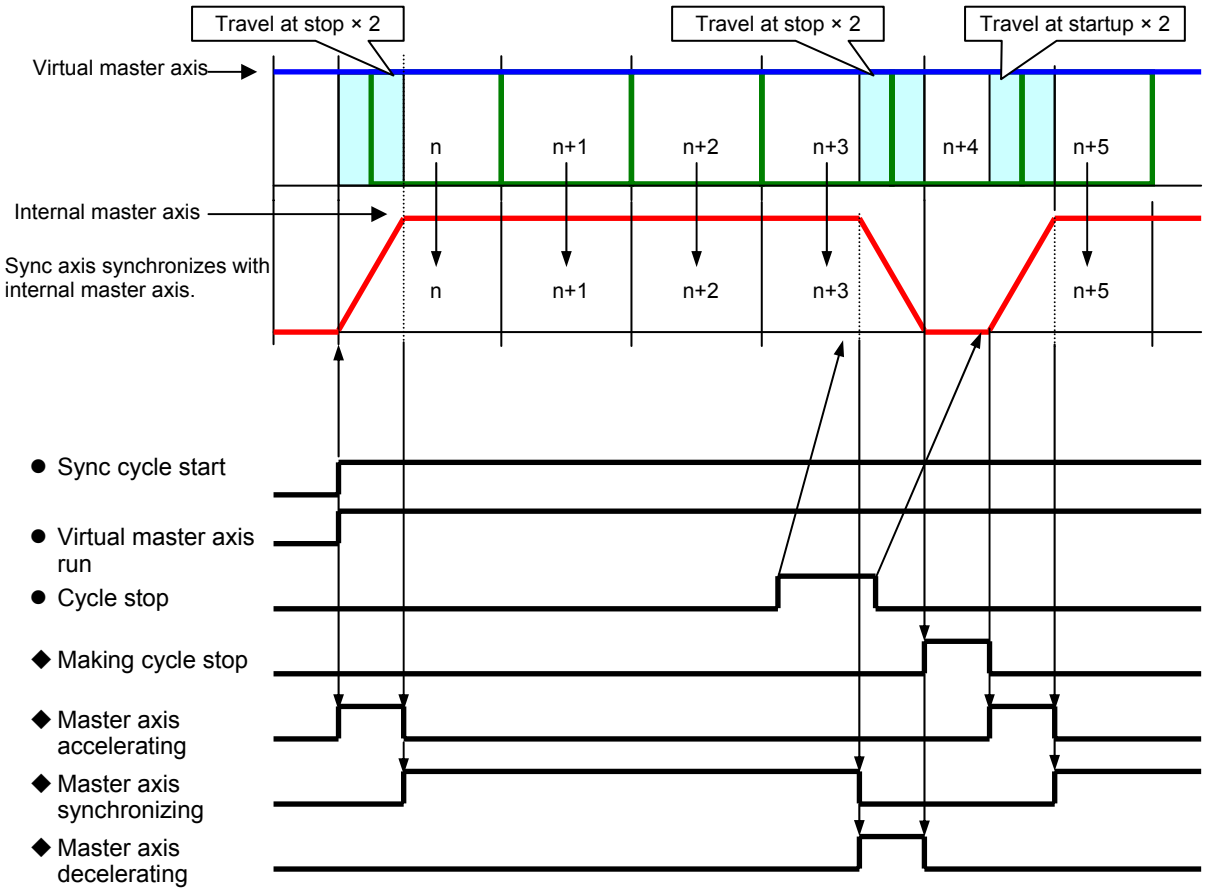
<For virtual master>



Control block



<For external pulse>



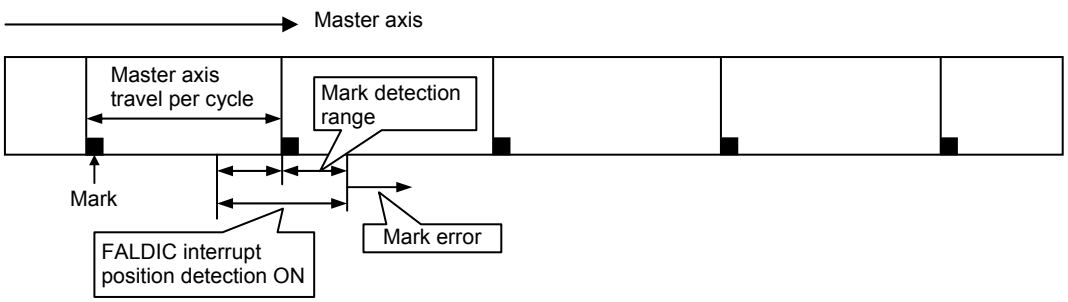
* The master axis and sync axis are out of phase with each other by the length set in [travel at startup].

(8) Mark length measurement start (+17 7bit)

At the rising edge of this signal, mark measurement is started. A mark sensor is assigned to the interrupt signal of axis 1. The data of measurement between marks is used as [Master axis travel per cycle] of an axis with [Mark selection] enabled. [Mark selection] is available in [Cycle synchronous] and [Rotary shear].

Parameters related to mark length measurement are shown below.

Item	Setting range	Description
Mark detection range	0 to 2147483647	This parameter is used for timing when FALDIC interrupt position detection is set ON and for mark error detection.
Disabled mark number	0 to 99	The set number of marks are not measured when synchronization is started. When disabled, the master axis operates with the master axis travel per cycle.
Mark error count	1 to 99	The set number of mark errors are detected, a mark error occurs to stop synchronization.

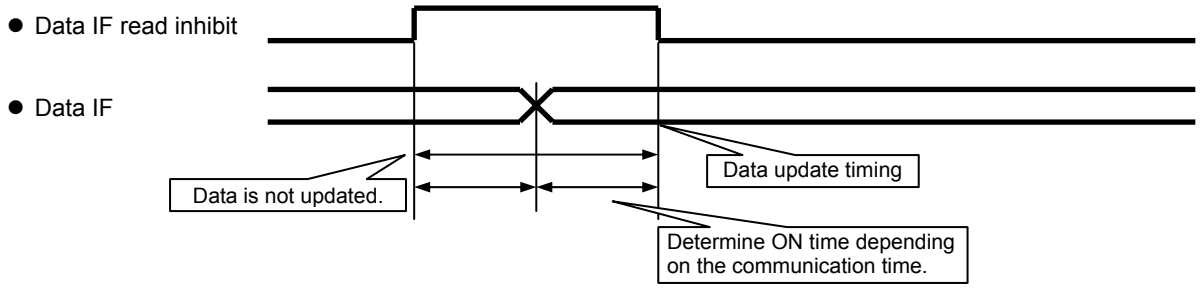


(9) Data IF display edit disable (+19 Fbit)

While this signal is ON, the data interface area (WL11000 to 11049) is not changed from display unit.
This is used when you want to set the data interface area from the user PLC but not from display unit.

(10) Data IF read inhibit (+19 Ebit)

While this signal is ON, data in the data interface area (WL11000 to 11049) cannot be read.
This is used when uniqueness of data is required, for example when writing data from the PLC using 8WAY function of display unit.


Data IF read inhibit
Data IF
Data update timing
Data is not updated.
Determine ON time depending on the communication time.

3-2-2 External/Virtual master axis Bit area [Motion → Controller]

(1) Virtual master axis running (+6 Fbit)
This signal is set ON while the virtual master axis is running.
For more information about the detail timing, refer to “3-2-1 (2) Virtual master axis run”.

(2) Virtual master axis accelerating (+6 Ebit)
This signal is set ON while the virtual master axis is accelerating.
For more information about the detail timing, refer to “3-2-1 (2) Virtual master axis run”.

(3) Virtual master axis decelerating (+6 Dbit)
This signal is set ON while the virtual master axis is decelerating.
For more information about the detail timing, refer to “3-2-1 (2) Virtual master axis run”.

(4) External encoder selection (+6 9bit)
This signal is set ON when the external encoder is selection for “virtual/external selection” in the parameter area.

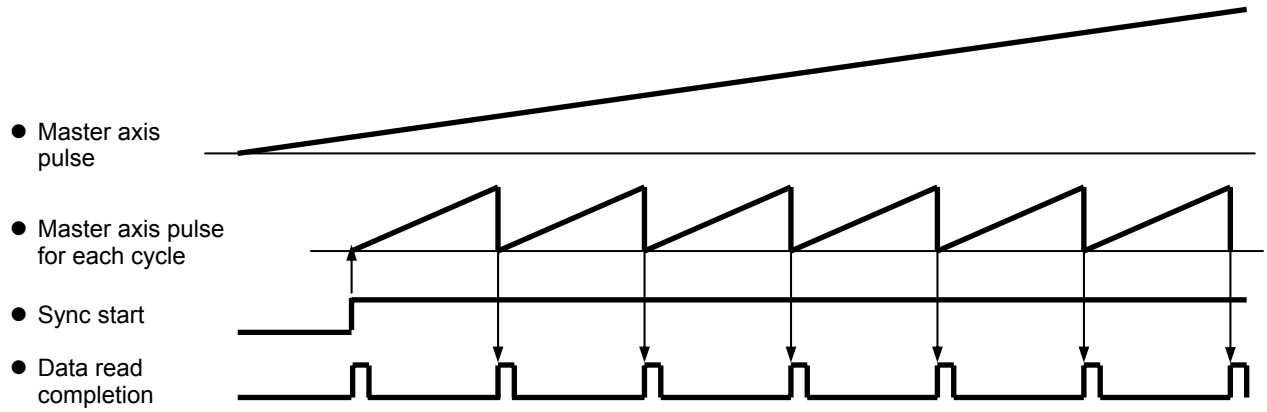
(5) Virtual master axis selection (+6 8bit)
This signal is set ON when the virtual master axis is selection for “virtual/external selection” in the parameter area.

(6) Synchronizing (+7 Fbit)
This signal is set ON when the internally controlled master axis reaches the target speed (sync speed).
For more information about the detail timing, refer to “3-2-1 (7) Cycle stop”.

(7) Sync accelerating (+7 Ebit)
This signal is set ON when the internally controlled master axis is accelerating to the target speed (sync speed).
For more information about the detail timing, refer to “3-2-1 (7) Cycle stop”.

(8) Sync decelerating (+7 Dbit)
This signal is set ON when the internally controlled master axis is decelerating from the target speed (sync speed).
For more information about the detail timing, refer to “3-2-1 (7) Cycle stop”.

(9) Data read completion (+7 12bit)
This signal is set ON for one scan period at the timing when the internally managed master axis cycle chenged to zero.



(10) Making cycle stop (+7 Bbit)
This signal is set ON while the master axis is making a cycle stop.
For more information about the detail timing, refer to “3-2-1 (7) Cycle stop”.

(11) Mark detection (+7 Abit)
This signal is set ON when a mark sensor is detected during mark length measurement.

(12) Setting error (+7 7bit)
This error is caused by the following causes. The master axis stops operation. Recover from the error with the alarm reset.
- Tact time × 3 < FALDIC sampling time

(13) Incremental value error (+7 5bit)
This error is caused by the following cause while the master axis is operating during sync cycle. The master axis stops operation. Recover from the error with the alarm reset.
- Incremental value of master axis pulse input for one tact >= Half of master axis travel per cycle

(14) Reverse rotation error (+7 4bit)
This error is caused by the following cause while the master axis is operating during sync cycle. The master axis stops operation. Recover from the error with the alarm reset.
- Master axis counter feed < Reverse feed limiter

(15) Mark error (+7 3bit)
This error is cause by the following cause during mark length measurement. Recover from the error with the alarm reset.
- Master axis counter feed < Reverse feed limiter

(16) Mechanical calculation overflow (+8 7bit)
Internal calculation overflowed during pulse correction operation. Check the mechanical data and enter a small value. Then, change the mechanical data again. If the calculation does not overflow, the signal is set OFF.

- Error detection timing
  1) When mechanical data is changed
  2) At the rising edge of [PTP reference]
  3) At power-on

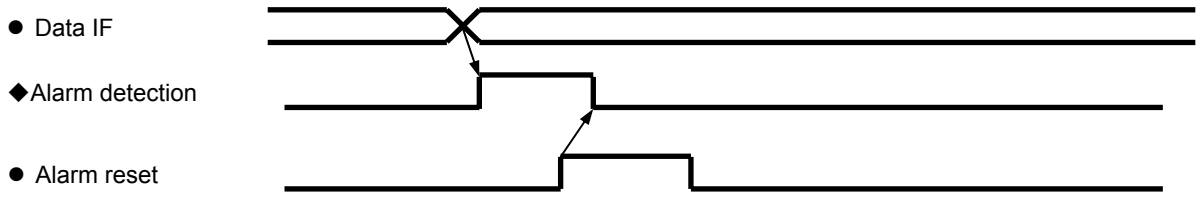
- Error occurrence condition
  Pulse correction α/β is obtained by the following formulas. Then, the pulse correction α/β is reduced and the result is controlled as an interim calculated value.

  ◆ No mechanism:
  Pulse correction calculation is not performed.
  ◆ Belt:
  Pulse correction α: Number of gears on the mechanism side × Number of pulses per encoder rotation
  Pulse correction β: Number of gears on the motor side × Number of pulley teeth × Travel per tooth × Decimal point position
  ◆ Ball screw:
  Pulse correction α: Number of gears on the mechanism side × Number of pulses per encoder rotation
  Pulse correction β: Number of gears on the motor side × Lead × Decimal point position
  ◆ Sealer/Cutter:
  Pulse correction α: Number of gears on the mechanism side × Number of pulses per encoder rotation × 113
  Pulse correction β: Number of gears on the motor side × Roll dia. × Decimal point position × 355
  ◆ Feed roll:
  Pulse correction α: Number of gears on the mechanism side × Number of pulses per encoder rotation × 113
  Pulse correction β: Number of gears on the motor side × Roll dia. × Decimal point position × 355

(17) Unit conversion overflow (+9 2bit)

This error is caused by an attempt to perform operation with the set value of 2147483648 pulses or more.
This error is output upon setting the data.
The target parameters are as follows.

- Mark detection range
- Travel at startup
- Travel at stop
- Master axis travel per cycle



(18) Error summary (+9 0bit)

This is an “OR flag” of the following errors.

- Unit conversion overflow
- Setting error
- Incremental value error
- Reverse rotation error
- Mark error
- Mechanical calculation overflow

3-2-3 External/Virtual master axis Data area [Controller → Motion]

(1) Target speed (+10, +11)

Set the target speed of the virtual master axis.

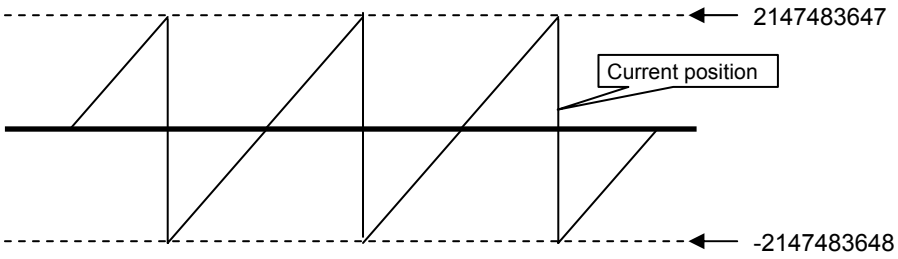
Setting range: 0 to 2147483647 [unit travel/unit speed time] or [r/min]

If a value smaller than 0 is set, it is assumed to be 0 and operation is not performed.

3-2-4 External/Virtual master axis Data area [Motion → Controller]

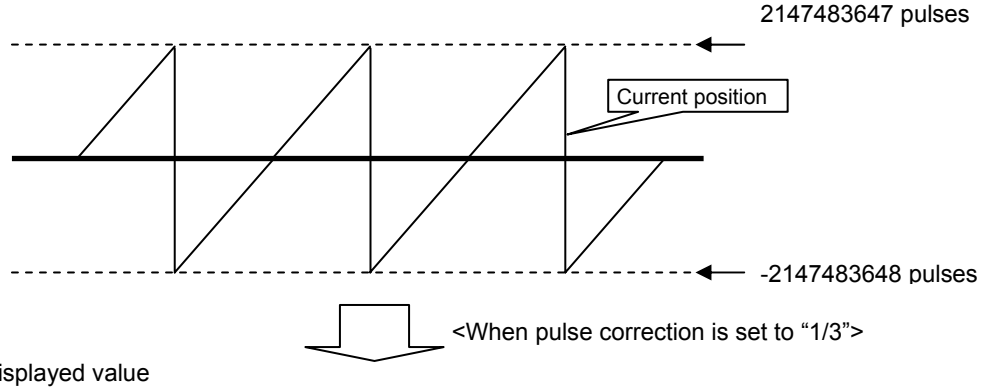
(1) Position data (+0, +1)

The current position of the virtual master axis or external encoder input is displayed. The unit is [Unit amount] or [Pulse] considering pulse correction. This is a ring counter whose display range is –2147483648 to 2147483647.

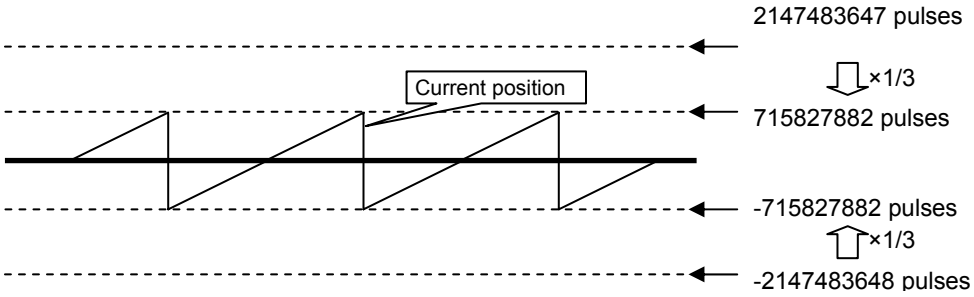


<Note>
The current position is internally managed with 32-bit pulse data.
When pulse correction value is displayed, the range is not –2147483648 to 2147483647.

- Internally controlled value

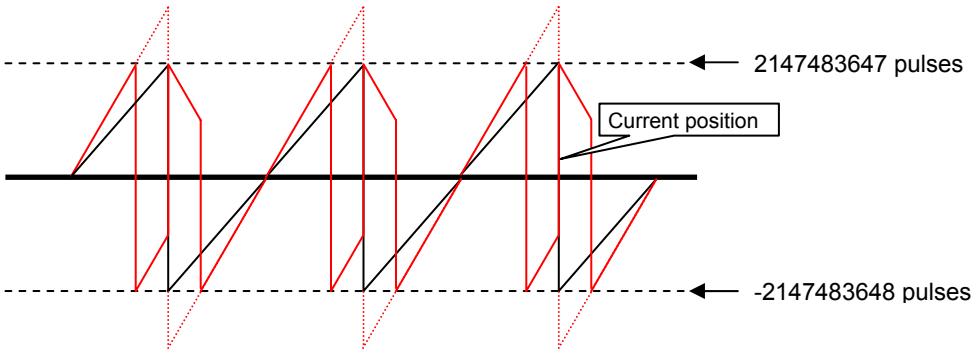


- Displayed value



*The fractional part is discarded when displayed.

<When pulse correction is set to “2/3”>



Red line indicates the current position.
If the current position overflows using a pulse correction value, no correct value is displayed.
In this case, refer to “Master axis current position in a cycle”.

(2) Speed data (+2, +3)

The current speed of the virtual master axis or external encoder input is displayed.
This data is the moving average speed for 50ms.

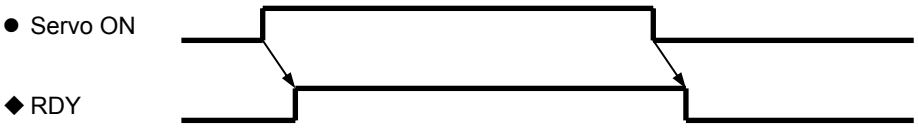
(3) Alarm status (+4)

The alarm status is displayed.
Currently, it is not used.

3-2-5 Motion axis Bit area [Controller → Motion]

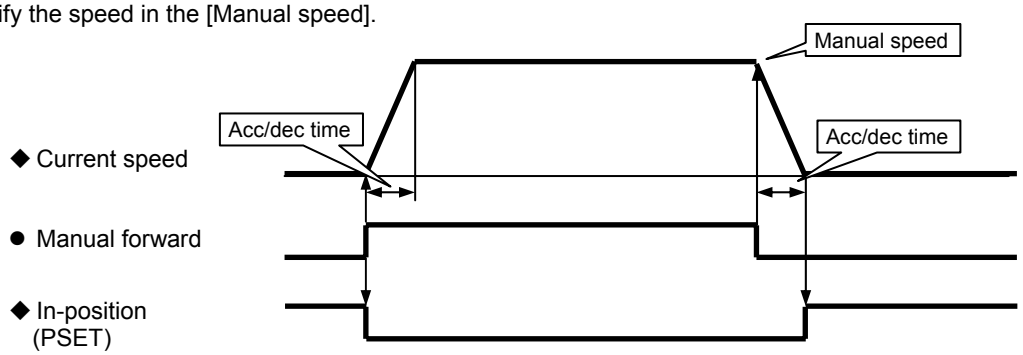
(1) Servo ON (+16 Fbit)

This signal locks the servo amplifier. When set ON, alarm reset is performed at the same time.
Servo operation cannot be performed unless this bit is set ON. When set OFF, the motor free-run.
If the motor is ready to operate after [Servo ON] is set ON, [RDY] is set ON.
After power ON of @E.Terminal, [+OT] and [-OT] is not detected until this signal is set ON.



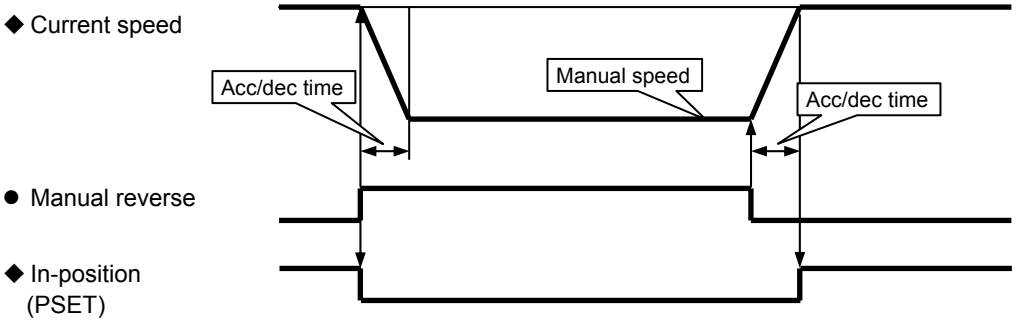
(2) Manual forward (+16 Ebit)

When this signal is set ON, the current position moves in the direction of addition. When set OFF, it stops.
Specify the speed in the [Manual speed].



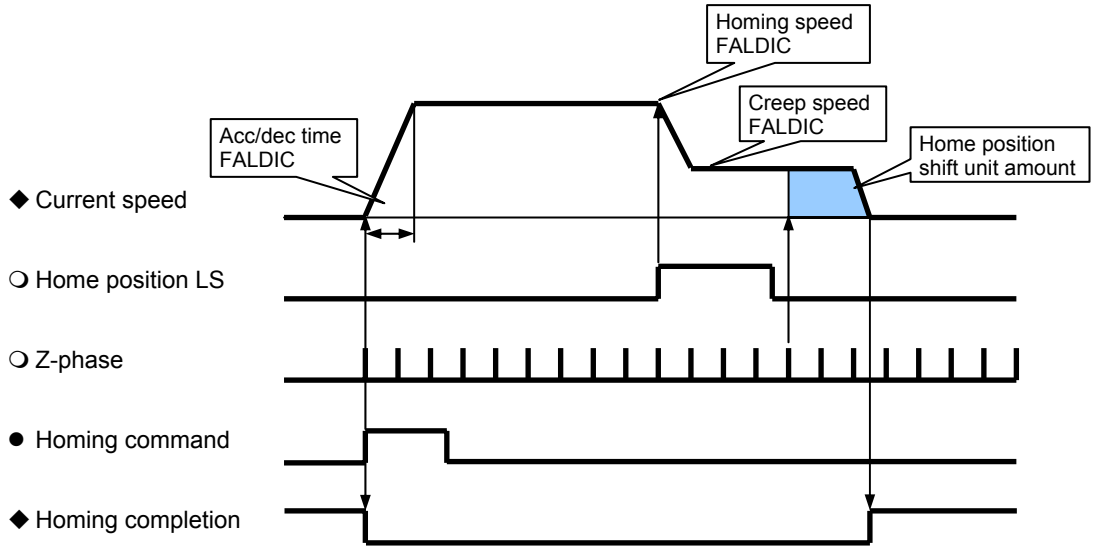
(3) Manual reverse (+16 Dbit)

When this signal is set ON, the current position moves in the direction of subtraction. When set OFF, it stops.
Specify the speed in the [Manual speed].



(4) Homing command (+16 Cbit)

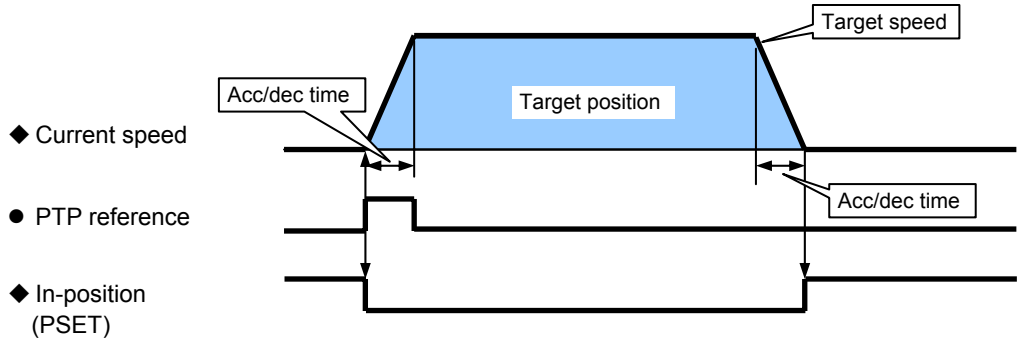
At the rising edge of this signal, homing is started. Homing is performed using the function of FALDIC, therefore, make the detail settings in the parameter of FALDIC.



The above timing chart shows one example of operation. For more information, refer to the user's manual of FALDIC.

(5) PTP reference (+16 Bbit)

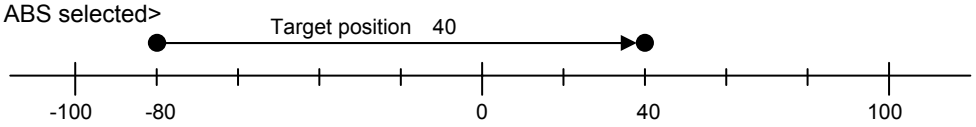
At the rising edge of this signal, PTP (Point To Point) operation is started.
The operation is performed according to the settings of [Target position] and [Target speed].



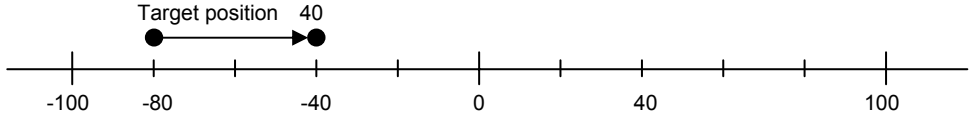
(6) PTP ABS (+16 Abit)

There are the following two methods of specifying the target position of PTP operation: ABS (absolute position) and INC (relative position).

<When ABS selected>



<When INC selected>



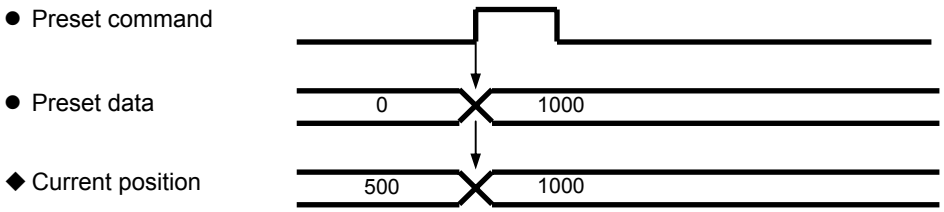
(7) Preset (+16 9bit)

At the rising edge of this signal, the current position is changed to [Preset data].
In FALDIC, the preset range is limited as follows:

FALDIC-α :-79999999 to 79999999
FALDIC ALPHA5 :-2000000000 to 2000000000

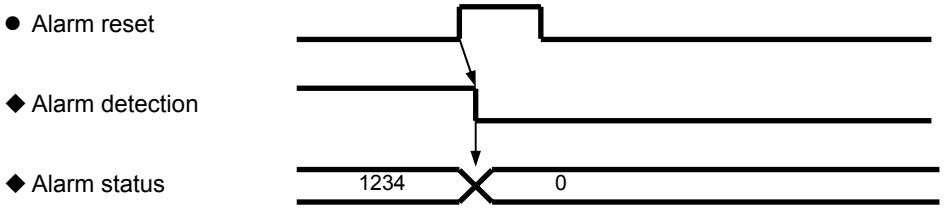
* When preset is done, it overwrites parameter of the FALDIC.
There is the overwriting limit which is up to 100,000 times. If it is frequently overwritten, change paremeter to RAM.
[Preset position data]
FALDIC-α :Standard parameter80
FALDIC ALPHA5 :PA2-19

*However, if you choose ABS (absolute position) system, parameter cannot be changed to RAM.
To change RAM, refer to “how to change to RAM” in FALDIC manual.



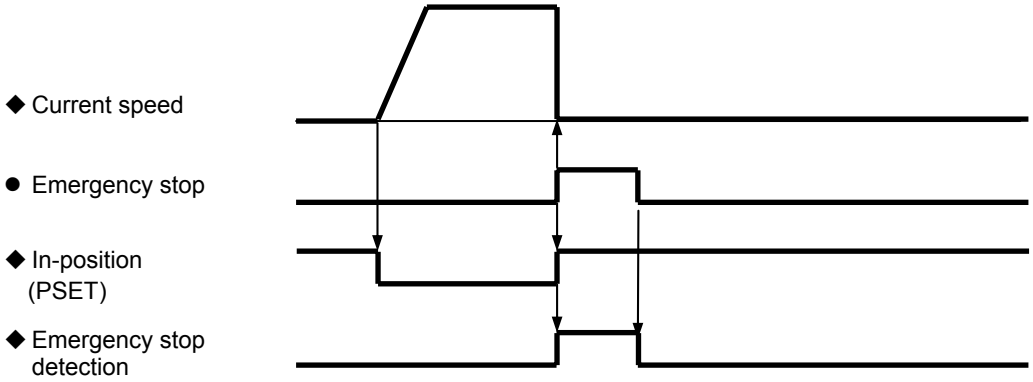
(8) Alarm reset (+16 8bit)

At the rising edge of this signal, a generated alarm is reset.



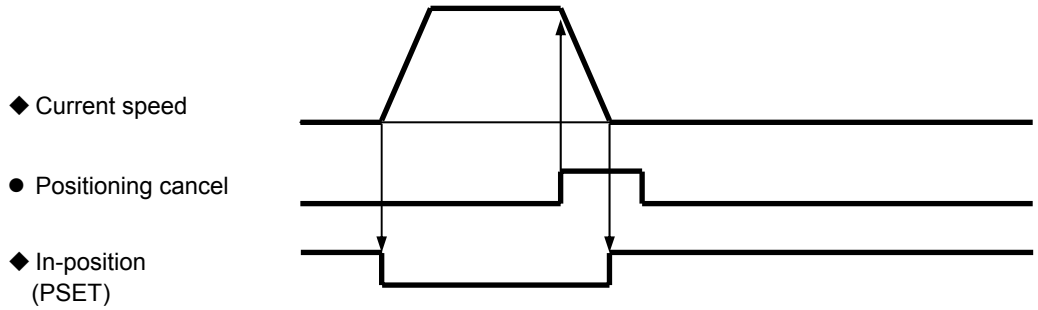
(9) Emergency stop (+16 7bit)

At the rising edge of this signal, positioning is stopped. The speed instantly becomes 0.



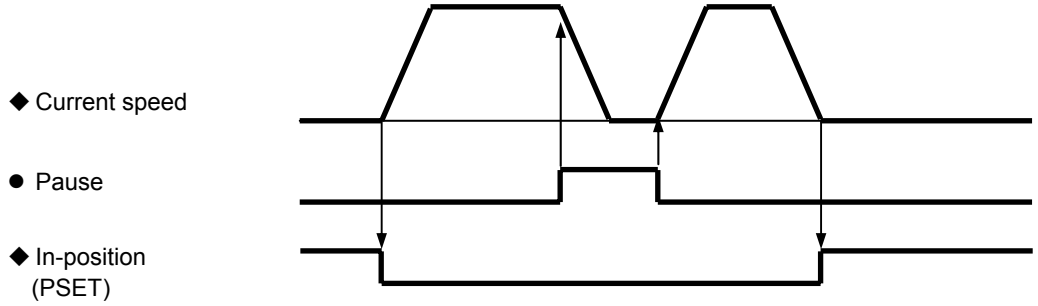
(10) Positioning cancel (+16 6bit)

At the rising edge of this signal, positioning is stopped. Controlled stop is caused.



(11) Pause (+16 5bit)

At the rising edge of this signal, positioning is stopped. When this signal is set OFF, positioning is resumed.



(12) Deviation clear (+16 4bit)

The deviation clear function of FALDIC is used.
While this signal is ON, the difference (deviation) between the command and homing positions is assumed to be 0.
In ALPHA5, edge setting is also possible in the parameter.

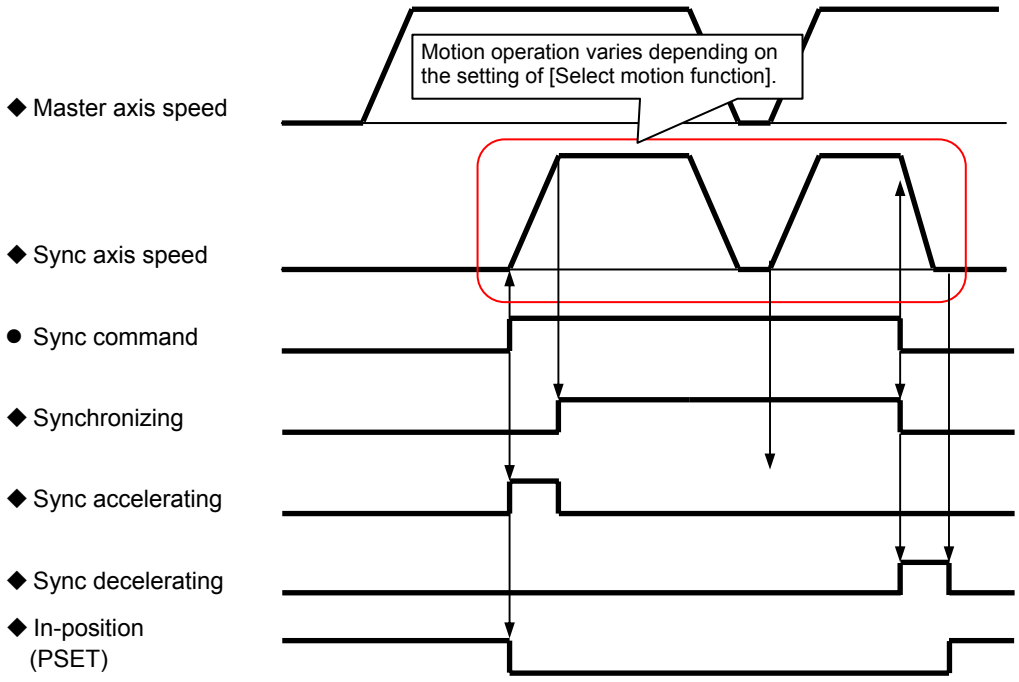
(13) Current position pulse display (+16 0bit)

When this signal is set ON, the current position (Motion → Controller Data area +0, +1) is displayed in pulse number and the current speed (Motion → Controller Data area +2, +3) in r/min.
When set OFF, a value after pulse correction is displayed.

Use this signal when you want to monitor the pulse control values that are internally used.

(14) Sync command (+17 Fbit)

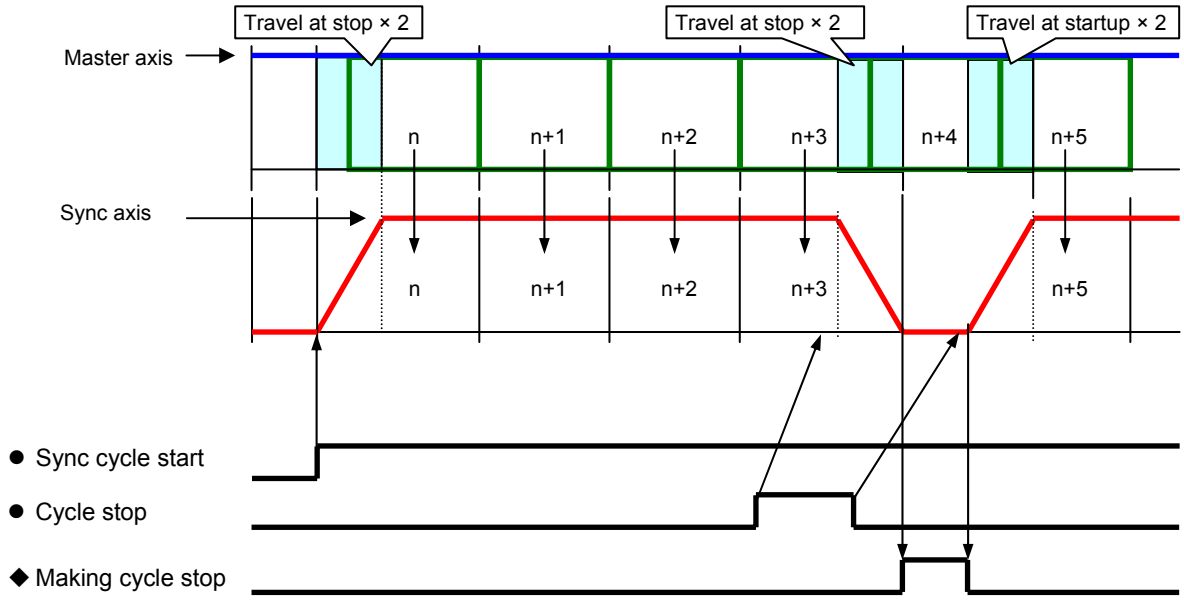
While this signal is ON, the sync axis operates in synchronization with the master axis.
Set the synchronous operation in the [Select motion function] in the parameter area.


Motion operation varies depending on the setting of [Select motion function].
◆ Master axis speed
◆ Sync axis speed
● Sync command
◆ Synchronizing
◆ Sync accelerating
◆ Sync decelerating
◆ In-position (PSET)

*If the signal is set OFF during synchronization, sync axis causes controlled stop.

(15) Sync command (+17 Ebit)

While this signal is ON, the sync axis makes a cycle stop. When set OFF, operation is resumed.
During a cycle stop, [Making cycle stop] is set ON and output of [Feedback position] does not change.
If [Cycle stop] is set ON at startup, the sync axis is instantly placed in a cycle stop state.
During cycle stop operation, the sync axis stops at the position where [sync axis cycle setting] feed is completed.
Even while [Making cycle stop], [Data read completion] is set ON for one scan period if the master axis travels for the length set in [Master axis cycle setting].



*The master axis and sync axis are out of phase with each other by the length set in [Travel at startup].

(16) Mark detection selection (+17 Dbit)

This signal is used only when cycle synchronous, rotary shear, or flying shear is selected in the [Select motion function].

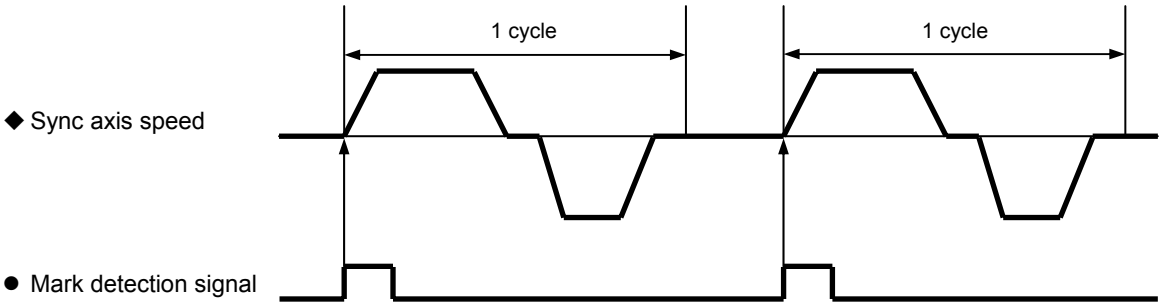
◆ For cycle synchronous or rotary shear

When this signal is set ON, mark length measurement data is used. If the master axis does not perform mark length measurement, operation is performed with the set value.

◆ For flying shear

If this signal is ON when [Sync command] is set as ON, [Mark detection signal] becomes the start trigger of flying shear.

When this signal is set OFF, the next cycle is automatically started when one master axis cycle is completed.



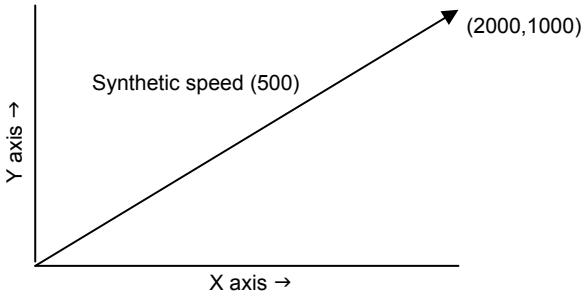
Assign the mark signal to the interrupt signal input of FALDIC.

(17) 2-axis linear interpolation command (+17 Abit)

Two-axis linear interpolation is performed in the following combinations. This signal is only enabled for odd-numbered axes (axis 1,3,5 or 7).

	X axis	Y axis
Combination 1	Axis 1	Axis 2
Combination 2	Axis 3	Axis 4
Combination 3	Axis 5	Axis 6
Combination 4	Axis 7	Axis 8

Positioning is performed by setting position data of the X and Y axes, and synthetic speed.



<Speed calculation>

X-axis speed = (Synthetic speed * X-axis travel) / $\sqrt{(\text{X-axis travel}^2 + \text{Y-axis travel}^2)}$

Y-axis speed = (Synthetic speed * Y-axis travel) / $\sqrt{(\text{X-axis travel}^2 + \text{Y-axis travel}^2)}$

In the case of the above example, the speeds are as follows.

X-axis speed = (500 * 2000) / $\sqrt{(2000^2 + 1000^2)} \fallingdotseq 447$

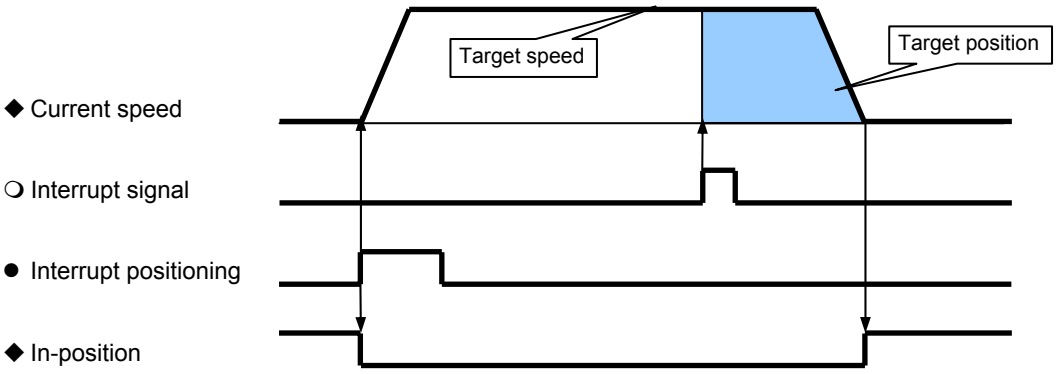
Y-axis speed = (500 * 1000) / $\sqrt{(2000^2 + 1000^2)} \fallingdotseq 223$

<Operation>

- When [2-aixs linear interpolation command] is set ON, interpolation is started.
- In addition, the following signals are enabled: [PTP_ABS], [Emergency stop], [Positioning cancel], and [Pause]. (for the X axis only)
- The target position is set in the X and Y axes, however, the speed is set in the X axis.
- Acceleration/deceleration speed and S-curve settings of interpolation depends on the settings of the X axis.

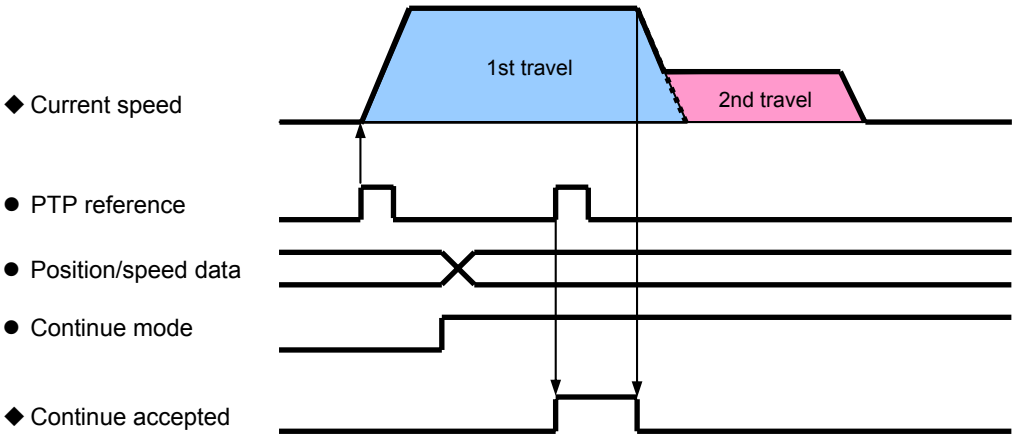
(18) Interrupt positioning (+17 9bit)

At the rising edge of this signal, operation is started at the set speed. When the interrupt signal is set ON, the master axis stops after operating to the target position.



(19) Continue mode (+17 8bit)

When this signal is set ON, [PTP positioning] and [2-axis linear interpolation command] can be executed in succession.
Either INC or ABS can be selected.
While [Continue accepted] signal is ON, this signal is not accepted.
While this bit is ON, changes of [Speed data] are ignored.
Note: Operation is performed using the data at first startup for acceleration/deceleration time. Therefore, the acceleration time of the second and the subsequent times are different from the first one.



(20) Phase compensation (+17 6bit)

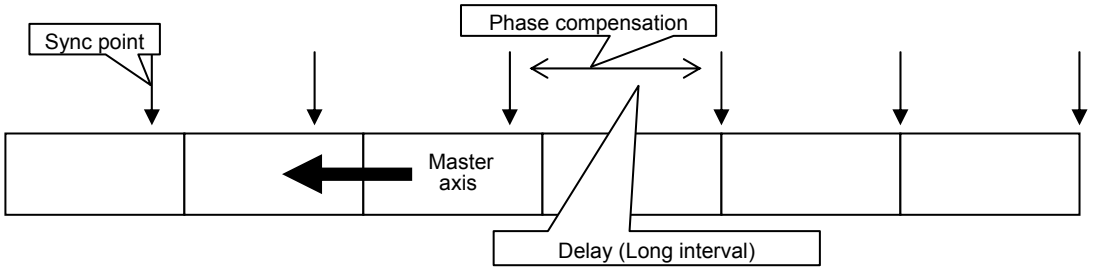
At the rising edge of this signal, phase compensation is started. Phase compensation can be performed only during synchronous operation.

Parameters related to phase compensation are shown below.

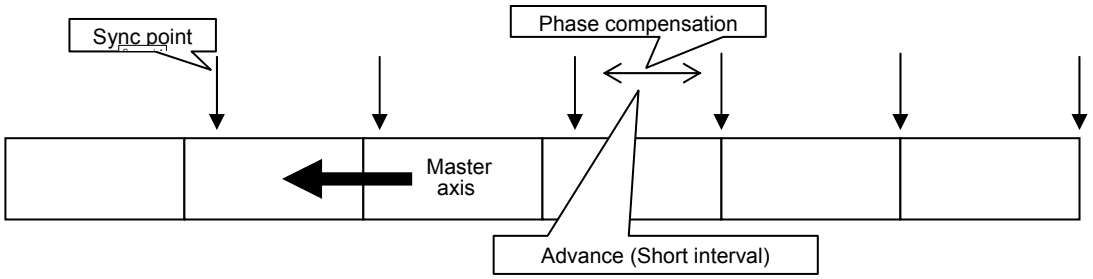
Item	Setting range	Description
Phase compensation length	0 to 2147483647	Set the travel of the sync axis for phase compensation.
Phase compensation upper limit	0 to Master axis travel per cycle/10	Set the upper limit of phase compensation performed during one cycle. If the phase compensation length is higher than phase compensation upper limit, compensation is performed in multiple cycles.

When phase compensation length is set as +, sync axis travel per cycle increases temporarily.
Sync point lags (backward against master axis).
When phase compensation length is set as -, sync point procees to opposite direction (forward against master axis).

● +Compensation

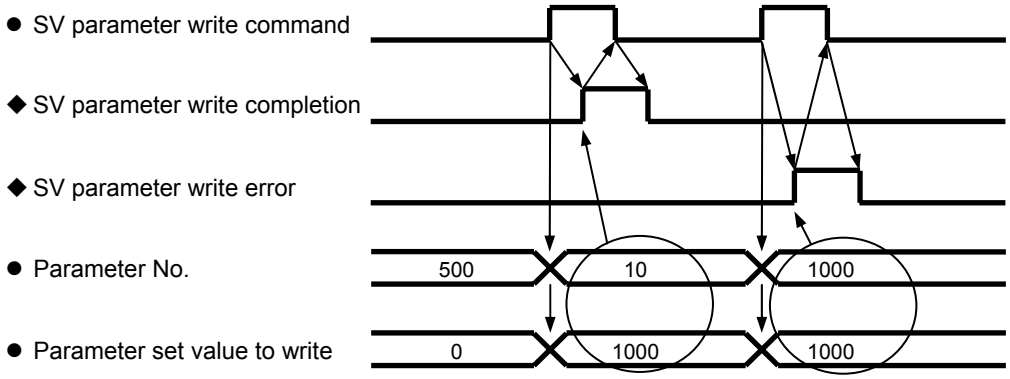


● -Compensation



(21) SV parameter write command (+18 Fbit)

At the rising edge of this signal, parameters are written into the servo amplifier.
Set parameter No. and parameter set value to write. For each setting range, refer to the user's manual of FALDIC.



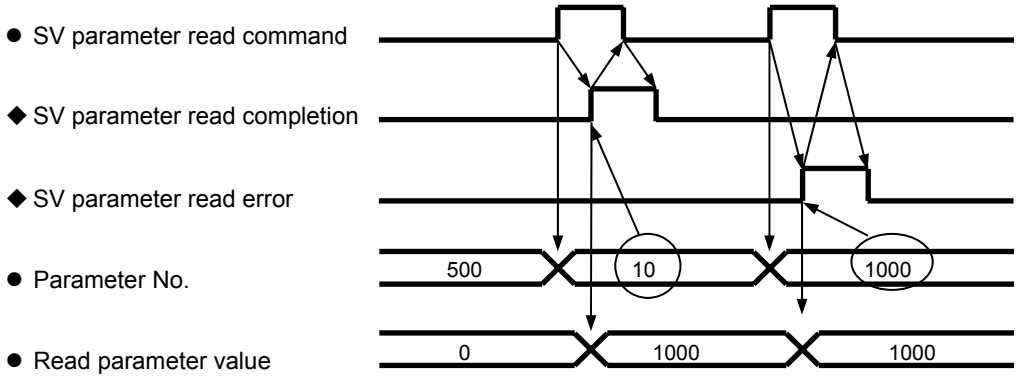
<Parameter No.>

Set value	FALDIC-α	FALDIC ALPHA5
0 to 99	Standard parameter	Parameter PA1
100 to 199	System parameter	Parameter PA2
200 to 299	-	Parameter PA3

* The last two digits of the set value become the actual parameter No.

(22) SV parameter read command (+18 Ebit)

At the rising edge of this signal, parameters are read from the servo amplifier.
Set parameter No. and parameter set value to read. For each setting range, refer to the user's manual of FALDIC.



<Parameter No.>

Set value	FALDIC-α	FALDIC ALPHA5
0 to 99	Standard parameter	Parameter PA1
100 to 199	System parameter	Parameter PA2
200 to 299	-	Parameter PA3

* The last two digits of the set value become the actual parameter No.

(23) SV parameter mode (+18 8bit)

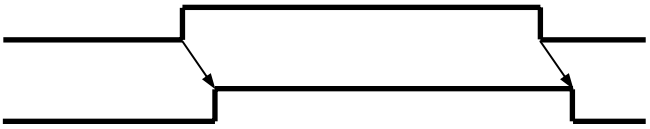
To write or read SV parameters, “SV parameter mode” must be enabled.
When placed in SV parameter mode, the general-purpose interface area changes as follows.

<Motion → Controller>
+2 : Homing speed (lower) → Read parameter value (lower)
+3 : Homing speed (upper) → Read parameter value (upper)
<Controller → Motion>
+10 : Target position (lower) → Parameter set value to write (lower)
+11 : Target position (upper) → Parameter set value to write (upper)
+12 : Target speed (lower) → Parameter No.

* In SV parameter mode, preset cannot be performed.

● SV parameter mode

◆ SV parameter mode response



(24) Data IF display edit disable (+19 Fbit)

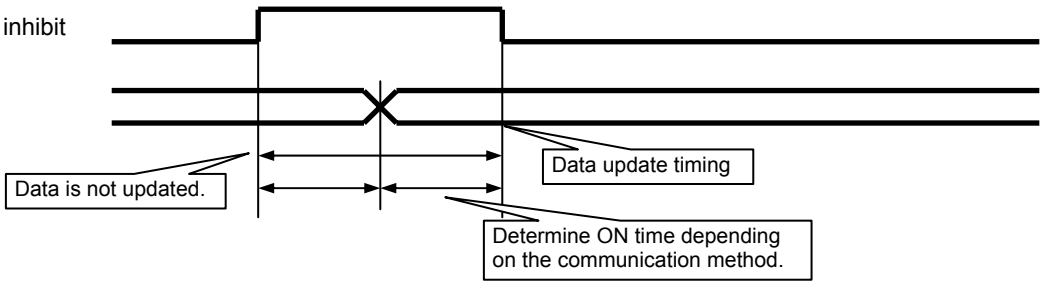
While this signal is ON, the data interface area (WL11050 to 11099 in the case of axis 1) is not changed from the display.
This is used when you want to set the data interface area from the user PLC but not from the display.

(25) Data IF read inhibit (+19 Ebit)

While this signal is ON, data in the data interface area (WL11050 to 11099, etc.) is not read to the contents.
This is used when uniqueness of data is required, for example when writing data from the PLC using 8WAY function of the display.

● Data IF read inhibit

● Data IF



3-2-6 Motion axis Bit area [Motion → Controller]

(1) RDY (+6 Fbit)

RDY signal of FALDIC is output.
When [Servo ON] is set ON and the servomotor becomes ready to rotate, [RDY] signal is set ON showing the ready state.
For more information about the detail timing, refer to “3-2-5 (1) Servo ON”.

(2) In-position PSET (+6 Ebit)

This signal is set ON when positioning is completed. While the servomotor is operating, this signal is set OFF.
This signal is set ON under the condition that pulse output has been completed and the servo amplifier zero deviation range.
For more information about the detail timing, refer to “3-2-5 (2) Manual forward”.

(3) Homing completion (+6 Dbit)

Homing completion signal of FALDIC is output.
Conditions for ON depends on the parameter of FALDIC.

<FALDIC-α>		
Standard parameter 66	Home position detection range	1 to 79999999 [× unit amount]
<FALDIC ALPHA5>		
PA2. 17	Home position detection range	0: Always ON after completion, 1 to 2000000000 [× unit amount]

For more information about the detail timing, refer to “3-2-5 (4) Homing command”.

(4) Interpolating (+6 Abit)

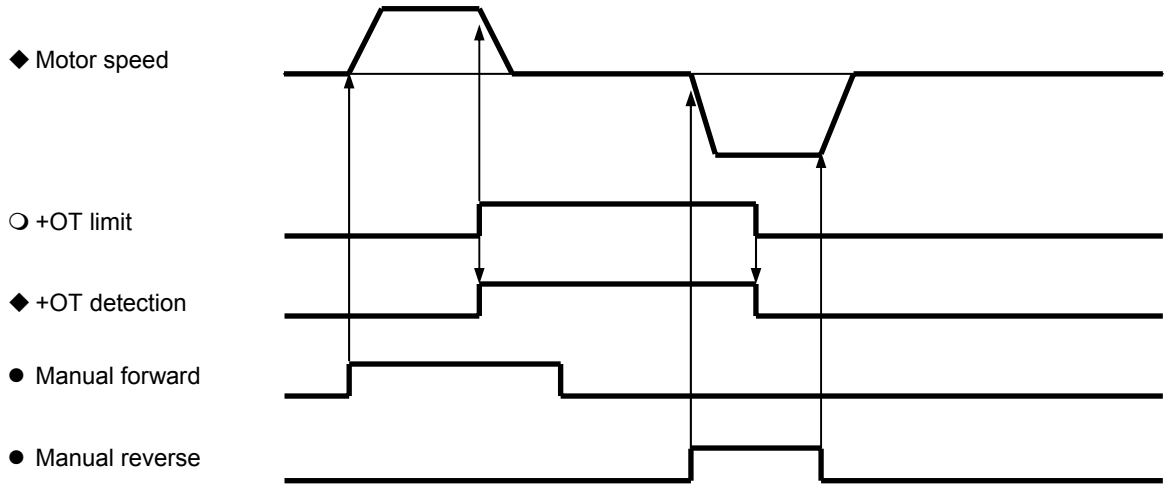
This signal is set ON during 2-axis linear interpolation. While this bit is operating, [Emergency stop], [Pause], and [Positioning cancel] of axis 1, 3, 5, or 7 are enabled for axis 2. For axis 2, 4, 6 or 8, they are disabled.

(5) Emergency stop detection (+6 7bit)

This signal is set ON when [Emergency stop] is ON or emergency stop of input of FALDIC is detected.
If emergency stop is reset, this signal is automatically set OFF. Emergency stop detection of FALDIC is output.
For more information about the detail timing, refer to “3-2-5 (9) Emergency stop”.

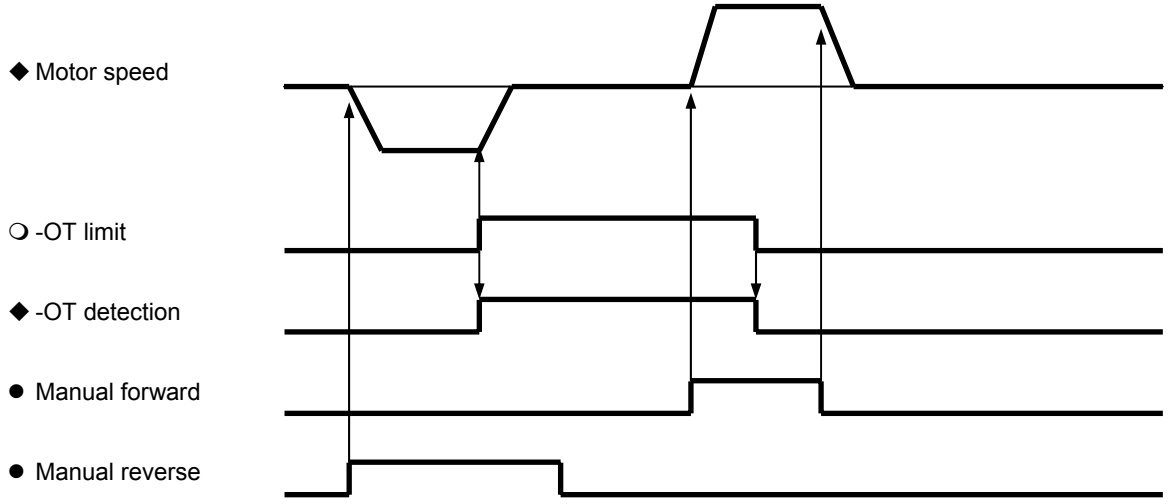
(6) +OT detection (+6 6bit)

When +OT limit is detected, this signal is set ON, and the motor decelerates and stops. +OT detection of FALDIC is output. This signal is enabled only during manual reverse rotation. This signal is automatically set OFF when getting out of +OT limit.



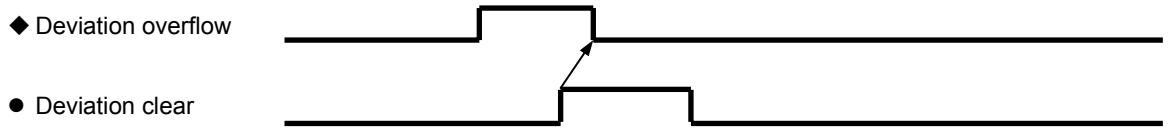
(7) -OT detection (+6 5bit)

When -OT limit is detected, this signal is set ON, and the motor decelerates and stops. -OT detection of FALDIC is output. This signal is enabled only during manual forward rotation. This signal is automatically set OFF when getting out of -OT limit.



(8) Deviation overflow (+6 4bit)

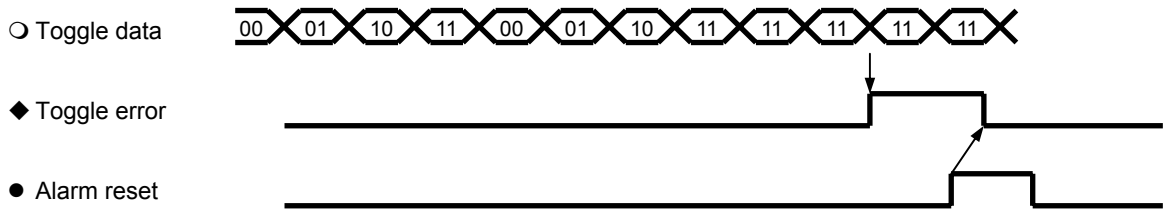
This signal is set ON when the difference between the command position and homing position exceeds the value set in the parameter of FALDIC. Deviation overflow of FALDIC is output. Reset this signal with [Deviation clear].



<FALDIC-α>
Standard parameter 54 Deviation overflow width 10 to 65536 [× 100 pulses]
<FALDIC ALPHA5>
PA2. 69 Deviation overflow detection value 0.1 to 100.0 [rev]

(9) Toggle error (+6 3bit)

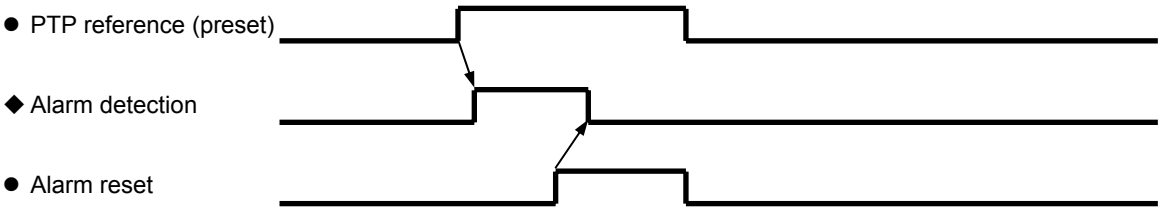
This signal is set ON when a communication (SX bus) error occurs between the controller and FALDIC.
A toggle error of FALDIC is output.
The controller changes two bits of toggle bit every tact to output to FALDIC. If the toggle bit does not change three tacts in a row, FALDIC judges that a communication error has occurred and decelerates and stops the servomotor. How to decelerate and stop the servomotor is set in the parameter of FALDIC.



(10) Unit conversion overflow (+6 2bit)

This error occurs if an attempt is made to perform during PTP operation or preset action exceeding 2147483647 pulses. Max. travel in one PTP operation (preset) is 2147483647 pulses.

Note: In FALDIC, the preset range is limited as follows. If the following range is exceeded but not 2147483648, "position data out-of-range" occurs in FALDIC.
FALDIC-α : -79999999 to 79999999
FALDIC ALPHA5 : -2000000000 to 2000000000

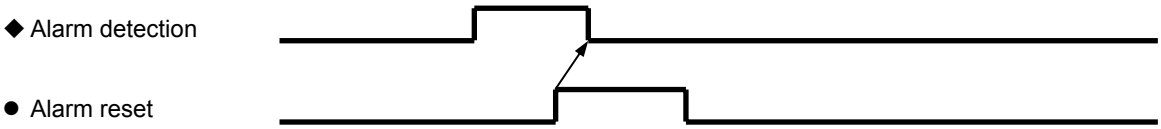


(11) Interrupt overrun (+6 1bit)

This error occurs if the servomotor cannot stop at the target position from interrupt sensor detection during interrupt operation. Increase the travel after interrupt or decrease the acceleration/deceleration time.

(12) FALDIC alarm overrun (+6 0bit)

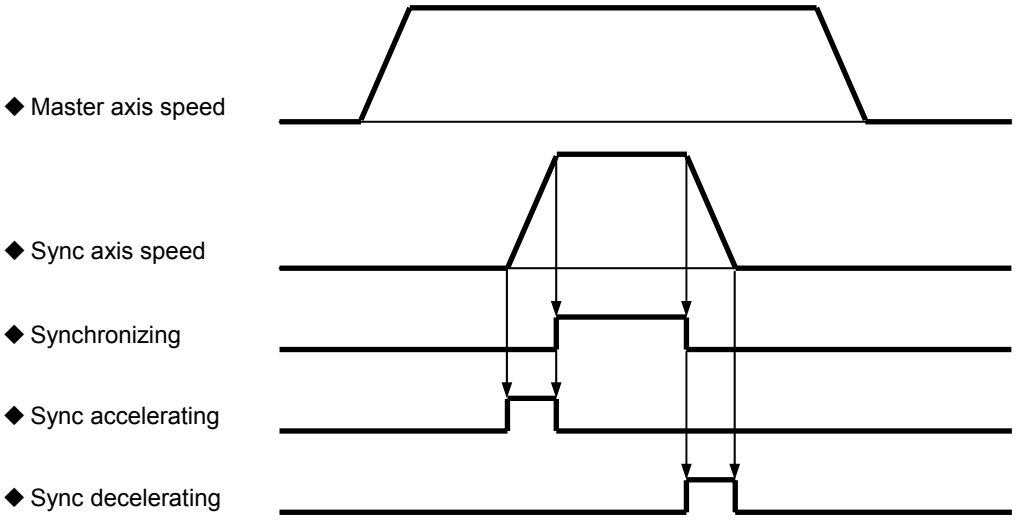
When the servo amplifier detects an alarm, this signal is set ON and held on the servo amplifier side. After the cause of the alarm is removed, this signal is set OFF on the rising edge of [Alarm reset]. Alarm detection of FALDIC is output.



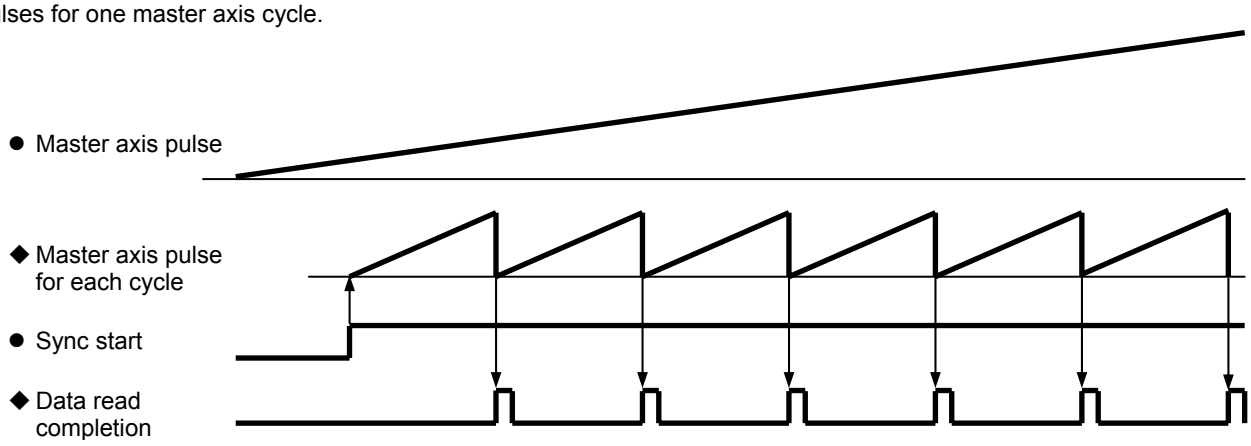
(13) Synchronizing (+7 Fbit)
This signal is set ON when the master axis and sync axis are in synchronization.

(14) Sync accelerating (+7 Ebit)
This signal is set ON when the sync axis is accelerating to synchronize with the master axis.

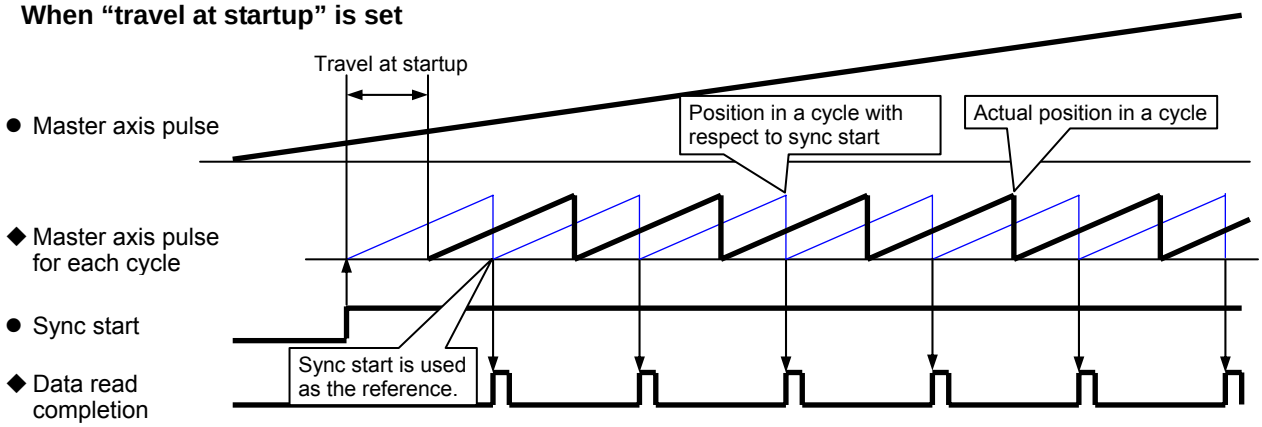
(15) Sync decelerating (+7 Dbit)
This signal is set ON when the sync axis is decelerating to stop.



(16) Data read completion (+7 Cbit)
This signal is set ON for one scan period at the timing when the internally controlled master axis cycle monitor reads pulses for one master axis cycle.



When "travel at startup" is set


Travel at startup
Position in a cycle with respect to sync start
Actual position in a cycle
● Master axis pulse
◆ Master axis pulse for each cycle
● Sync start
◆ Data read completion
Sync start is used as the reference.

(17) Making cycle stop (+7 Bbit)
This signal is set ON when the sync axis has stopped by [Cycle stop] signal.
For more information about the detail timing, refer to “3-2-5 (15) Cycle stop”.

(18) Cut command (+7 Abit)
The timing when the cutter is set ON during flying shear operation is output.

(19) Compensating phase (+7 9bit)
This signal is set ON while compensating phase. While this bit is ON, [Phase compensation] is not accepted.

(20) Continue accepted (+7 8bit)
This signal is set ON when the next startup is accepted in [Continue mode]. This signal is set OFF when ready to accept the start signal again.

(21) Master axis cycle setting error (+7 7bit)
This error is caused by the following cause during motion operation. The sync axis stops operation. Recover from the error with the alarm reset.
• Master axis travel per cycle < Min. value of master axis travel per cycle
In the case of flying shear, this error is also caused by an attempt to start the next cycle during synchronous operation.
This error occurs in [Cycle synchronous], [Rotary shear], or [Flying shear].

(22) Sync axis ratio setting error (+7 6bit)
This error is caused by the following cause during motion operation. The sync axis stops operation. Recover from the error with the alarm reset.
• Sync axis travel per cycle < Min. value of sync axis travel per cycle
This error occurs in [Cycle synchronous].

(23) Incremental value error (+7 5bit)
This error is cause by the following cause during motion operation. The sync axis stops operation. Recover from the error with the alarm reset.
• Incremental value of master axis pulse input for one tact >= Half of master axis travel per cycle
This error occurs in [Cycle synchronous], [Rotary shear], or [Flying shear].

(24) Reverse rotation detection (+7 4bit)
This error is cause by the following cause during motion operation. The sync axis stops operation. Recover from the error with the alarm reset.
• Master axis counter feed < Reverse feed limiter
This error occurs in [Cycle synchronous], [Rotary shear], or [Flying shear].

(25) Synchronization width setting error (+7 2bit)
This error is cause by the following causes during motion operation. The sync axis stops operation. Recover from the error with the alarm reset.
• Master axis sync width + Acceleration length + Deceleration length >= Master axis travel per cycle
Or,
• Sync axis travel per cycle < Cutter axis sync width
This error occurs in [Rotary shear], or [Flying shear].

(26) SV parameter write completion (+8 Fbit)
This is a response signal to [SV parameter write command]. When the write is completed successfully, this signal is set ON. Overwrite complete signal of FALDIC is output.
For more information about the detail timing, refer to “3-2-5 (21) SV parameter write command”.

(27) SV parameter read completion (+8 Ebit)
This is a response signal to [SV parameter read command]. When the read is completed successfully, this signal is set ON. Reading complete signal of FALDIC is output.
For more information about the detail timing, refer to “3-2-5 (22) SV parameter read command”.

(28) SV parameter write error (+8 Dbit)
This is an erroneous response signal to [SV parameter write command]. Error check is performed in FALDIC.
For more information about the detail timing, refer to “3-2-5 (21) SV parameter write command”.

(29) SV parameter read error (+8 Cbit)
This is an erroneous response signal to [SV parameter read command]. Error check is performed in FALDIC.
For more information about the detail timing, refer to “3-2-5 (22) SV parameter read command”.

(30) SV parameter response (+8 8bit)
This is a response signal to [SV parameter mode].
For more information about the detail timing, refer to “3-2-5 (23) SV parameter mode”.

(31) Mechanical calculation overflow (+8 7bit)
Internal calculation overflowed during pulse correction operation. Check the mechanical data and enter a small value. Then, change the mechanical data again. If the calculation does not overflow, the signal is set OFF.

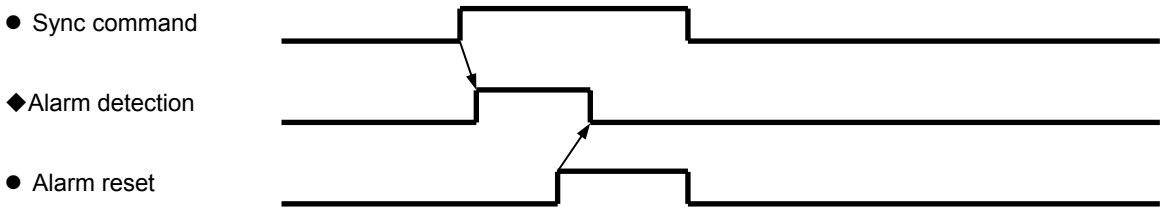
- Error detection timing
  4) When mechanical data is changed
  5) At the rising edge of [PTP reference]
  6) At power-on

- Error occurrence condition
  Pulse correction α/β is obtained by the following formulas. Then, the pulse correction α/β is reduced and the result is controlled as an interim calculated value.

  ◆ No mechanism:
  Pulse correction calculation is not performed.
  ◆ Belt:
  Pulse correction α: Number of gears on the mechanism side × Number of pulses per encoder rotation
  Pulse correction β: Number of gears on the motor side × Number of pulley teeth × Travel per tooth × Decimal point position
  ◆ Ball screw:
  Pulse correction α: Number of gears on the mechanism side × Number of pulses per encoder rotation
  Pulse correction β: Number of gears on the motor side × Lead × Decimal point position
  ◆ Sealer/Cutter:
  Pulse correction α: Number of gears on the mechanism side × Number of pulses per encoder rotation × 113
  Pulse correction β: Number of gears on the motor side × Roll dia. × Decimal point position × 355
  ◆ Feed roll:
  Pulse correction α: Number of gears on the mechanism side × Number of pulses per encoder rotation × 113
  Pulse correction β: Number of gears on the motor side × Roll dia. × Decimal point position × 355

(32) Unit conversion overflow [Sync] (+9 2bit)

This error occurs if sync-related data set in the data IF area internally exceeds 2147483647 pulses.
The allowable value during synchronous operation is 2147483647 pulses.



(33) Error summary (+9 0bit)

This is an “OR flag” of the following errors.

- Emergency strop
- +OT
- -OT
- Deviation overflow
- Toggle error
- Unit conversion overflow (PTP)
- Interrupt overrun
- FALDIC alarm detection
- Master axis cycle setting error
- Sync axis cycle setting error
- Incremental value error
- Reverse rotation error
- Synchronization width setting error
- Mechanical calculation overflow
- Unit conversion overflow (Sync)

3-2-7 Motion axis Data area [Controller → Motion]

(1) Target position/Parameter set value to write (+10, +11)

This parameter is used as a target position data for [PTP reference]. The unit set in the mechanical data is used. This is 32-bit signed data. The range varies depending on the data of unit conversion.
This parameter is used as a parameter set value to write for [SV parameter write command].

(2) Target speed (+12, +13)/Parameter No. (+12)

This parameter is used as target speed data for [PTP reference]. The unit set in the mechanical data is used.
The range varies depending on the data of unit conversion.
This parameter is used as a parameter No. for [SV parameter write command] or [SV parameter read command].
Set as follows depending on the servo amplifier or parameter type.

<Parameter NO.>

Set value	FALDIC-α	FALDIC ALPHA5
0-99	Standard parameter	Parameter PA1
100-199	System parameter	Parameter PA2
200-299	-	Parameter PA3

* The last two digits of the set value become the actual parameter No.

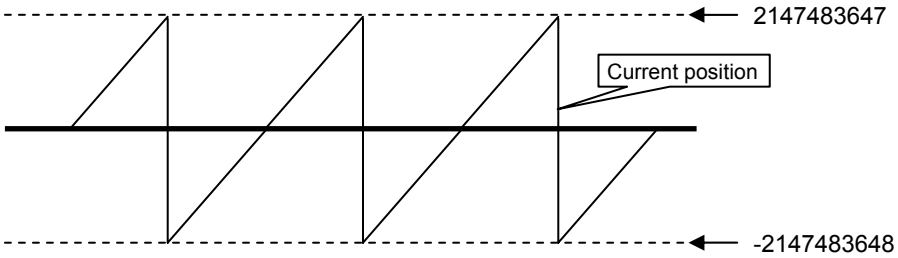
(3) Preset data (+14, +15)

At the rising edge of [Preset] signal, the current position is overwritten with this data.
This is 32-bit signed data.
The range varies depending on the data of unit conversion.
Preset is performed using the function of FALDIC.

3-2-8 Motion axis Data area [Motion → Controller]

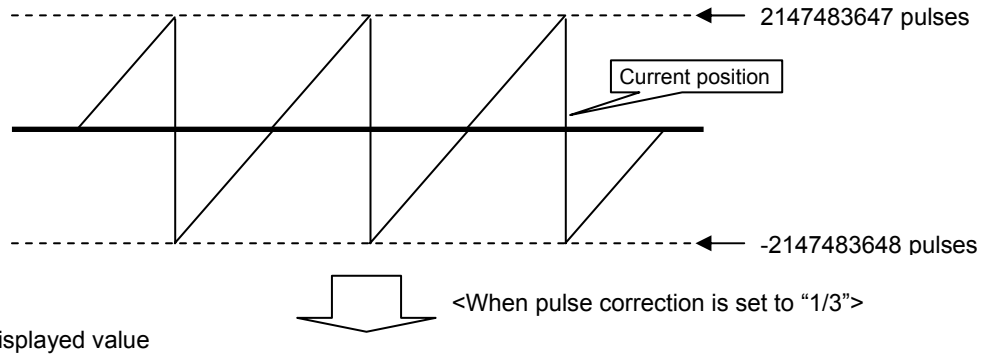
(1) Feedback position (+0, +1)

The current position of the servo is displayed.
The unit is [Unit amount] or [Pulse] considering pulse correction.
This is a ring counter whose display range is –2147483648 to 2147483647.



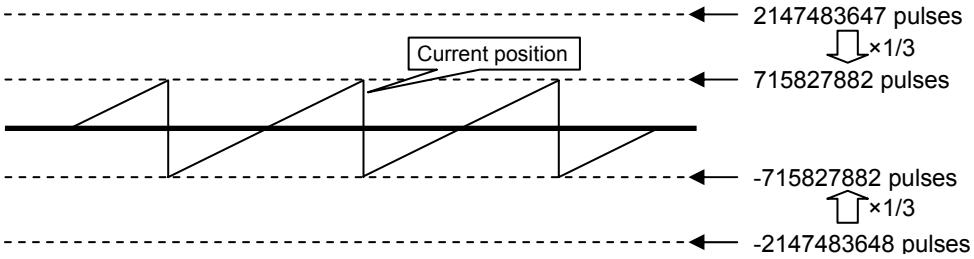
<Note>
The current position is internally managed with 32-bit pulse data.
When pulse correction value is displayed, the range is not –2147483648 to 2147483647.

- Internally controlled value



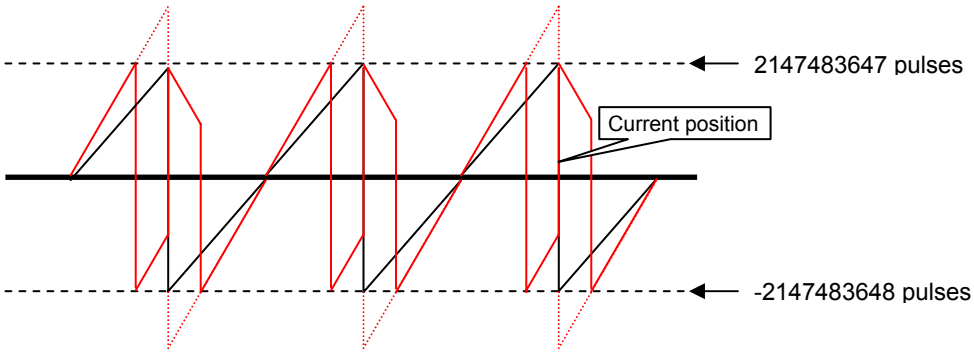
<When pulse correction is set to “1/3”>

- Displayed value



*The fractional part is discarded when displayed.

<When pulse correction is set to “2/3”>



Red line indicates the current position.
If the current position overflows using a pulse correction value, no correct value is displayed.
In this case, refer to “Master axis current position in a cycle”.

(2) Speed data (+2, +3)

The speed of the servomotor is displayed.
This data is the moving average speed for 50ms.

(3) Alarm status (+4)

The alarm status when FALDIC alarm is detected is displayed.

<Alarm list>

[FALDIC-α]

Code	Content
01h	Overload
02h	-
03h	Amplifier overheat
04h	Breaking resistor
05h	Deviation overflow
06h	Overcurrent
07h	Overspeed
08h	Overvoltage
09h	Control / Main power undervoltage
0Ah	Encoder trouble
0Bh	-
0Ch	Circuit trouble
0Dh	Memory error
0Eh	-
0Fh	Fuse broken

Code	Content
10h	Encoder communication error
11h	Motor combination error
12h	Braking transistor error
13h	CONT (control signal) error
14h	Encoder overheat
15h	Absolute data lost
16h	Absolute data over Flow
17h	Terminal error
18h	-
19h	Address error (BCD error)
1Ah	Address error (Out-of-range error)
1Bh	Data error (BCD error)
1Ch	Data error (Out-of-range)
1Dh	Data error (Negative sign)
1Eh	-
1Fh	System error

[FALDIC-ALPHA5]

Code	Content
01h	Overload1 / Overload2
02h	Pulse command frequency error
03h	Amplifier overheat
04h	Breaking resistor / transistor error
05h	Deviation overflow
06h	Overcurrent1 / Overcurrent2
07h	Overspeed
08h	Overvoltage
09h	Control / Main power undervoltage
0Ah	Encoder trouble1 / trouble2
0Bh	Initial error
0Ch	Circuit trouble
0Dh	Memory error
0Eh	
0Fh	Fuse broken

Code	Content
10h	Encoder communication error
11h	Motor combination error
12h	Braking transistor error
13h	CONT (control signal) Error
14h	Encoder overheat
15h	Absolute data lost 1 / 2 / 3
16h	Multi-turn data over flow
17h	Battery warning
18h	Life warning
19h	Address error (BCD error)
1Ah	Address error (Out-of-range error)
1Bh	Data error (Command rejection)
1Ch	Data error (BCD error)
1Dh	Data error (Out-of-range, 0 written)
1Eh	Data error (Negative sign)
1Fh	-

(4) FALDIC external counter (+5)

The external counter value of FALDIC is displayed.

3-3 System Area

<Outline>

[When using SX-Programmer Standard]

Address	Size	Name
WM11000 to WM11029	30W	Motion application ↓ Controller
WM11030 to WM11059	30W	Controller ↓ Motion application

[When using SX-Programmer Expert (D300win)]

Address	Size	Name
%MW1.11000 to %MW1.11029	30W	Motion application ↓ Controller
%MW1.11030 to %MW1.11059	30W	Controller ↓ Motion application

<Details>

• Motion application → Controller

Address		Name	Remark
WM11000	%MW1.11000	Contents type	1: Motion
WM11001	%MW1.11001	Contents version	Version
WM11002	%MW1.11002	Bit status	
WM11003	%MW1.11003	Contents status	Error code of contents level
WM11004	%MW1.11004	Contents execution cycle latest value	(μs)
WM11005	%MW1.11005	Contents execution time latest value	(μs)
WM11006	%MW1.11006	Contents execution cycle max. value	(μs)
WM11007	%MW1.11007	Contents execution time max. value	(μs)
WM11008	%MW1.11008		
WM11009	%MW1.11009		
WM11010	%MW1.11010	Contents operation check counter	Counter behaves as follows: 0 → 1 → 2…65534 → 65535 → 0 → 1
WM11011	%MW1.11011		
WM11012	%MW1.11012	I/O terminal 1 input/output status	
WM11013	%MW1.11013	I/O terminal 2 input/output status	
WM11014	%MW1.11014	I/O terminal 3 input/output status	
WM11015	%MW1.11015	I/O terminal 4 input/output status	
WM11016	%MW1.11016	I/O terminal 5 input/output status	
WM11017	%MW1.11017	I/O terminal 6 input/output status	
WM11018	%MW1.11018	I/O terminal 7 input/output status	
WM11019	%MW1.11019	I/O terminal 8 input/output status	
WM11020	%MW1.11020		
WM11021	%MW1.11021		
WM11022	%MW1.11022		
WM11023	%MW1.11023		
WM11024	%MW1.11024		
WM11025	%MW1.11025		
WM11026	%MW1.11026		
WM11027	%MW1.11027	Contents toggle error (for controller unit)	1: When toggle error occurs. 0: When reset
WM11028	%MW1.11028	Contents toggle error (for PLC)	1: When toggle error occurs. 0: When reset
WM11029	%MW1.11029	Contents toggle error (for display unit)	1: When toggle error occurs. 0: When reset

• Controller → Motion application

Address		Name	Remark
WM11030	%MW1.11030	Execution cycle max. value clear	Cleared at the rising edge of 0 to 1.
WM11031	%MW1.11031		
WM11032	%MW1.11032		
WM11033	%MW1.11033		
WM11034	%MW1.11034		
WM11035	%MW1.11035		
WM11036	%MW1.11036		
WM11037	%MW1.11037		
WM11038	%MW1.11038		
WM11039	%MW1.11039		
WM11040	%MW1.11040		
WM11041	%MW1.11041		
WM11042	%MW1.11042		
WM11043	%MW1.11043		
WM11044	%MW1.11044		
WM11045	%MW1.11045		
WM11046	%MW1.11046		
WM11047	%MW1.11047		
WM11048	%MW1.11048		
WM11049	%MW1.11049		
WM11050	%MW1.11050		
WM11051	%MW1.11051	Toggle error reset (for controller unit)	1: Resets contents toggle error.
WM11052	%MW1.11052	Toggle error monitoring timer (ms) (for controller unit)	Toggle error occurs if the contents toggle bit does not change for the set period of time. 0: Not monitored
WM11053	%MW1.11053	Contents toggle bit (for controller unit)	Commands as follows: 0 → 1 → 2…65534 → 65535 → 0 → 1
WM11054	%MW1.11054	Toggle error reset (for PLC)	1: Resets contents toggle error.
WM11055	%MW1.11055	Toggle error monitoring timer (ms) (for PLC)	Toggle error occurs if the contents toggle bit does not change for the set period of time. 0: Not monitored
WM11056	%MW1.11056	Contents toggle bit (for PLC)	Commands as follows: 0 → 1 → 2…65534 → 65535 → 0 → 1
WM11057	%MW1.11057	Toggle error reset (for display unit)	1: Resets contents toggle error.
WM11058	%MW1.11058	Toggle error monitoring timer (ms) (for display unit)	Toggle error occurs if the contents toggle bit does not change for the set period of time. 0: Not monitored
WM11059	%MW1.11059	Contents toggle bit (for display unit)	Commands as follows: 0 → 1 → 2…65534 → 65535 → 0 → 1

*Even one toggle error causes emergency stop.

3-3-1 Controller → Motion application

(1) Execution cycle max. value clear (WM11030, %MW1.11030)
At the rising edge of this signal, [Contents execution cycle max. value] and [Contents execution time max. value] are cleared.

(2) Toggle error reset (for controller unit) (WM11051, %MW1.11051)
When this signal is set to 1, a contents toggle error is reset

(3) Toggle error monitoring timer (for controller unit) (WM11052, %MW1.11052)
This is the time to monitor the contents toggle error. If “contents toggle bit” is not changed for the period of time set here, a contents toggle error occurs. The unit is “ms”.

(4) Contents toggle bit (for controller unit) (WM11053, %MW1.11053)
This bit monitors system toggle errors. If this signal is not changed for the period of time set in “Toggle error monitoring timer”, a contents toggle error occurs.

(5) Toggle error reset (for PLC) (WM11054, %MW1.11054)
When this signal is set to 1, a contents toggle error is reset.

(6) Toggle error monitoring timer (for PLC) (WM11055, %MW1.11055)
This is the time to monitor the contents toggle error. If “contents toggle bit” is not changed for the period of time set here, a contents toggle error occurs. The unit is “ms”.

(7) Contents toggle bit (for PLC) (WM11056, %MW1.11056)
This bit monitors system toggle errors. If this signal is not changed for the period of time set in “Toggle error monitoring timer”, a contents toggle error occurs.

(8) Toggle error reset (for display unit) (WM11057, %MW1.11057)
When this signal is set to 1, a contents toggle error is reset.

(9) Toggle error monitoring timer (for display unit) (WM11058, %MW1.11058)
This is the time to monitor the contents toggle error. If “contents toggle bit” is not changed for the period of time set here, a contents toggle error occurs. The unit is “ms”.

(10) Contents toggle bit (for display unit) (WM11059, %MW1.11059)
This bit monitors system toggle errors. If this signal is not changed for the period of time set in “Toggle error monitoring timer”, a contents toggle error occurs.

3-3-2 Motion application → Controller

(1) Contents type (WM11000, %MW1.11000)

The contents application type built into the controller unit is output.

1: Motion application

(2) Contents version (WM11001, %MW1.11001)

The contents application version built into the controller unit is output.
If the version is V01.00, “100” is output.

(3) Bit status (WM11002, %MW1.11002)

Operation status of the contents program is output.

F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Contents error															

• Contents error
Set ON if an error occurs. [Contents status] is also set ON.

(4) Contents status (WM11003, %MW1.11003)

An error code is output when an error occurs in the contents.

Code	Status
0	No error
(Error at startup of @E.Terminal system -1 to –9)	
-1	Initial processing error (OS)
(Error during processing –100 to –32768)	
-101	Missing processing (processing exceeding tact period)

(5) Contents execution cycle latest value (WM11004, %MW1.11004)

The latest value of the execution cycle of the contents (synchronous control) is output. The unit is [µs].
The tact time is also taken into consideration.

(6) Contents execution time latest value (WM11005, %MW1.11005)

The latest value of the execution time of the contents (synchronous control) is output. The unit is [µs].
This is the actual execution time but not the control cycle.

(7) Contents execution cycle max. value (WM11006, %MW1.11006)

The maximum value of the execution cycle of the contents (synchronous control) is output. The unit is [µs].

(8) Contents execution time max. value (WM11007, %MW1.11007)

The maximum value of the execution time of the contents (synchronous control) is output. The unit is [µs].

(9) Contents operation check counter (WM11010, %MW1.11010)

This a 16-bit ring counter that changes during contents operation.
If this bit does not change when checked from the PLC, take a necessary measure such as stopping the system.

(10) I/O terminal n input/output status (WM11012 to WM11019, %MW1.11012 to %MW1.11019)

Input/output status of the I/O terminal is displayed.

(11) Contents toggle error (for built-in PLC) (WM11027, %MW1.11027)
This bit is set to 1 when a contents toggle error occurs. Axes in operation make emergency stop.
This bit is set to 0 by [Toggle error reset].

(12) Contents toggle error (for PLC) (WM11028, %MW1.11028)
This bit is set to 1 when a contents toggle error occurs. Axes in operation make emergency stop.
This bit is set to 0 by [Toggle error reset].

(13) Contents toggle error (for display unit) (WM11029, %MW1.11029)
This bit is set to 1 when a contents toggle error occurs. Axes in operation make emergency stop.
This bit is set to 0 by [Toggle error reset].

3-4 Data Interface Area

<Outline>

[When using SX-Programmer Standard]

Address	Size	Name
WL11000 to WL11049	50W	Virtual/External PG
WL11050 to WL11099	50W	Axis 1
WL11100 to WL11149	50W	Axis 2
WL11150 to WL11199	50W	Axis 3
WL11200 to WL11249	50W	Axis 4
WL11250 to WL11299	50W	Axis 5
WL11300 to WL11349	50W	Axis 6
WL10350 to WL10399	50W	Axis 7
WL11400 to WL11449	50W	Axis 8

[When using SX-Programmer Expert (D300win)]

Address	Size	Name
%MW3.11000 to %MW3.11049	50W	Virtual/External PG
%MW3.11050 to %MW3.11099	50W	Axis 1
%MW3.11100 to %MW3.11149	50W	Axis 2
%MW3.11150 to %MW3.11199	50W	Axis 3
%MW3.11200 to %MW3.11249	50W	Axis 4
%MW3.11250 to %MW3.11299	50W	Axis 5
%MW3.11300 to %MW3.11349	50W	Axis 6
%MW3.10350 to %MW3.10399	50W	Axis 7
%MW3.11400 to %MW3.11449	50W	Axis 8

<Details>

- External/virtual master axis

	F E D C B A 9 8 7 6 5 4 3 2 1 0	
+0	External pulse input value [Pulse]	Motion ↓ Controller
+1		
+2		
+3		
+4		
+5		
+6		
+7		
+8	Mark measurement length value (Processing of measuring length between marks for external PG)	
+9		
+10	Virtual master axis acceleration time [ms]	Controller ↓ Motion
+11		
+12	Virtual master forced deceleration time [ms]	
+13		
+14		
+15		
+16		
+17		
+18		
+19		
+20	Mark detection range (Processing of measuring length between marks for external PG)	
+21		
+22	Disabled mark number (Processing of measuring length between marks for external PG) Range: 0 to 99 times	
+23		
+24	Disabled error count (Processing of measuring length between marks for external PG) Range: 0 to 99 times	
+25		
+26		
+27		
+28		
+29		
+30	Travel at startup	
+31		
+32	Travel at stop	
+33		
+34	Master axis travel per cycle	
+35		
+36	Reverse feed limiter	
+37		
+38		
+39		

●Motion axis

	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	
+0	Command position [unit amount]																Motion ↓ Controller
+1																	
+2	Master axis position in a cycle [unit amount]																
+3																	
+4	Sync axis position in a cycle [unit amount]																
+5																	
+6	Sync mode No. response																
+7																	
+8																	
+9																	
+10	Acceleration/deceleration time [ms]																Controller ↓ Motion
+11	S-curve ratio [%]																
+12	Manual speed [unit amount/unit speed]																
+13																	
+14	Sync axis cycle setting [unit amount]																
+15																	
+16	Master axis cycle setting [unit amount]																
+17																	
+18	Master axis min. cycle setting [unit amount]																
+19																	
+20	Reverse feed limiter [unit amount]																
+21																	
+22	Travel at startup [unit amount]																
+23																	
+24	Travel at stop [unit amount]																
+25																	
+26	Master axis sync width [unit amount]																
+27																	
+28	Sync axis sync width [unit amount]																
+29																	
+30	Motion-specific parameter 1																
+31																	
+32	Motion-specific parameter 2																
+33																	
+34	Motion-specific parameter 3																
+35																	
+36	Motion-specific parameter 4																
+37																	
+38	Motion-specific parameter 5																
+39																	
+40																	
+41																	
+42																	
+43																	
+44																	
+45																	
+46	Phase compensation length																
+47	Phase compensation processing																
+48	Phase compensation upper limit																
+49	Phase compensation processing																

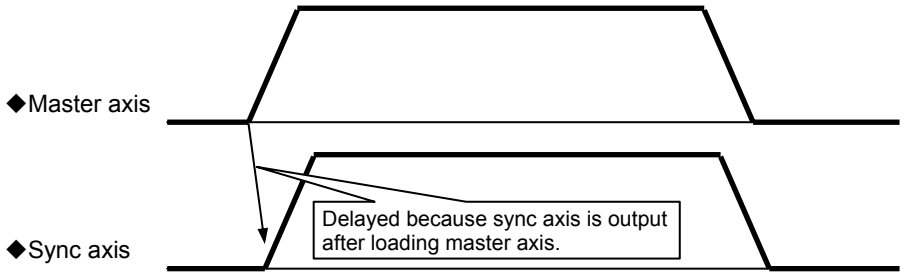
3-4-1 External/Virtual master axis

Either virtual axis or external PG is used as a master axis. (Select in the parameter area.)
In addition, FALDIC can be a master axis.

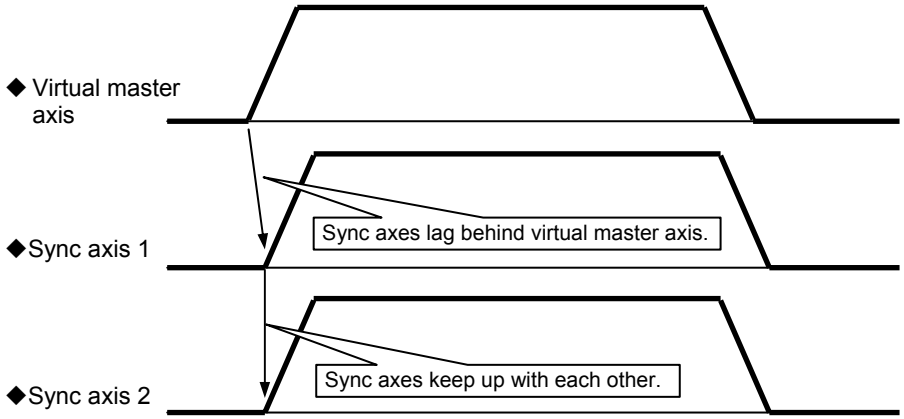
◆ **Virtual master axis**

In a PLC, a master axis is made to virtually operated to operate a sync axis with respect to it.
If an actual axis is made a master axis or sync axis, the sync axis lags behind the master axis and cannot synchronize with it.
In contrast, if a virtual master axis and sync axes 1 and 2 are set, sync axes 1 and 2 also lag behind the virtual master axis, but they operate in the same manner.

<Control of actual master axis → sync axis>

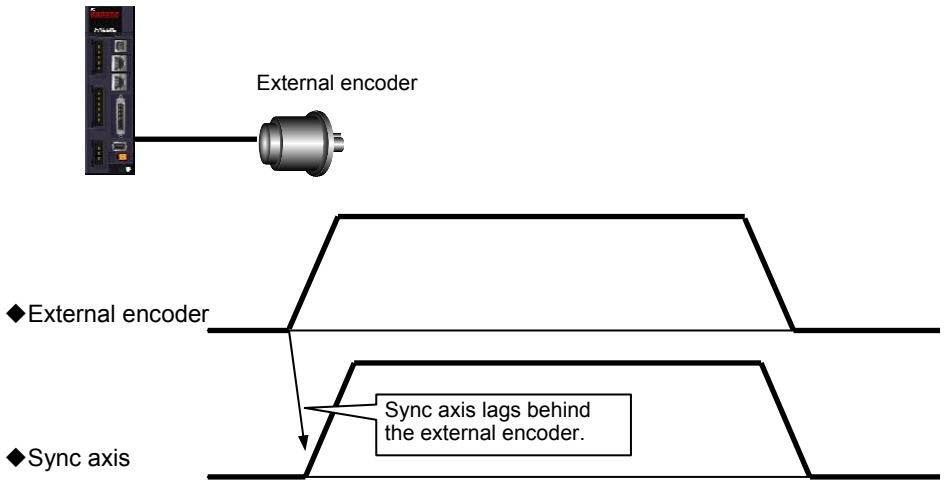


<Control of virtual master axis → sync axis × 2 >



◆ **External encoder**

Connect an external PG to FALDIC to make it a master axis. This is used, for example when the master axis is an inverter.

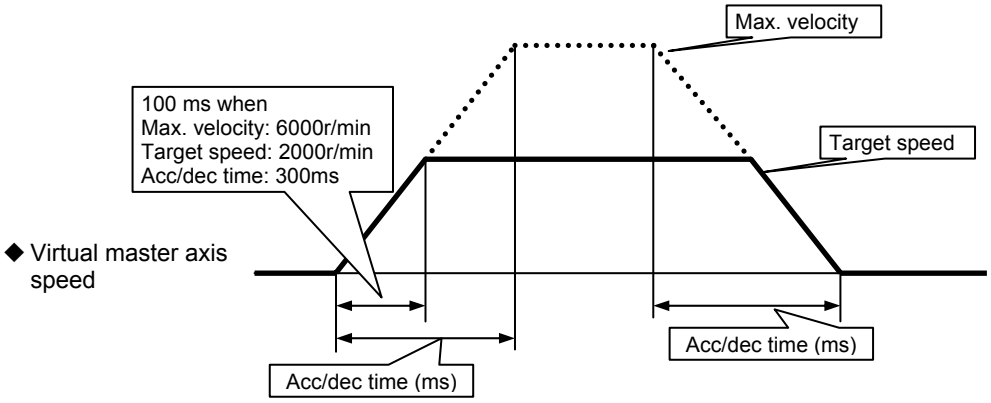


3-4-2 External/Virtual master axis [Controller → Motion]

(1) Virtual master axis Acceleration time (+10)

This is the acceleration time of the master axis. Set the time to reach [Max. velocity]. The unit is [ms].
It is not possible to set the acceleration and deceleration time separately.

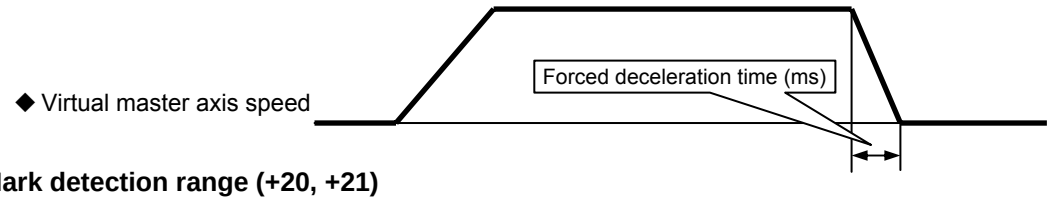
Setting range: 0 to 65535 [ms]



(2) Virtual master axis Forced deceleration time (+12)

This is the deceleration time for emergency stop of the virtual master axis. Set the time from [Max. velocity]. The unit is ms.

Setting range: 0 to 65536 [ms]



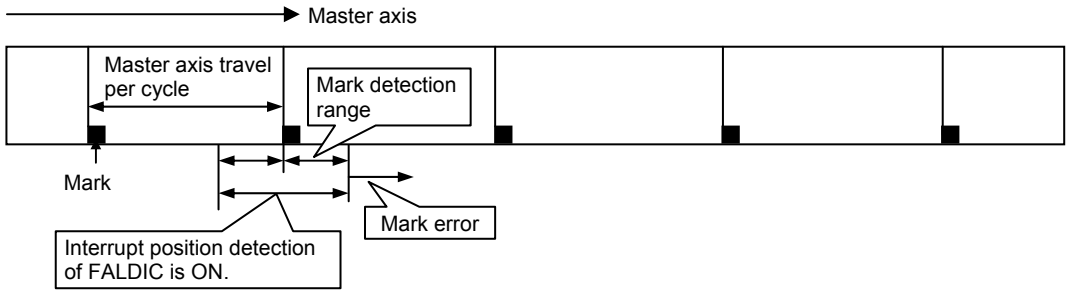
(3) Mark detection range (+20, +21)

This is the deceleration time for emergency stop of the virtual master axis. Set the time from [Max. velocity]. The unit is ms.

Setting range: 0 to 2147483647 [unit amount of master axis]
A value lower than 0 is assumed to be 0 and a value exceeding 2147483647 to be 2147483547

Interrupt detection ON timing:
[Master axis travel per cycle] – [Mark detection range] to [Master axis travel per cycle] + [Mark detection range]
* If a mark is detected out of the above range, it is ignored.

Mark error timing: [Master axis travel per cycle] + [Mark detection range] > Master axis position in a cycle



(4) Disabled mark number (+22, +23)

The set number of marks are not measured after [Mark length measurement start].
When disabled, the master axis operates with the master axis travel per cycle.
Cycles are counted when read mark sensor or master axis travel per cycle.

Setting range: 0 to 99 [cycles] A value lower than 0 is assumed to be 0 and a value exceeding 99 to be 99.

(5) Mark error count (+24, +25)

The set number of mark errors are detected, a mark error occurs to stop synchronization.

Setting range: 0 to 99 [times]

A value lower than 0 is assumed to be 0 and a value exceeding 99 to be 99.

(6) Travel at startup (+30, +31)

When the master axis operates twice the length set here after [Sync cycle start] is set ON, the internal master axis synchronizes with the input pulse. The acceleration of [Cycle stop] of the master axis is also determined by this setting.

Setting range: 0 to 2147483647 [unit amount of master axis]

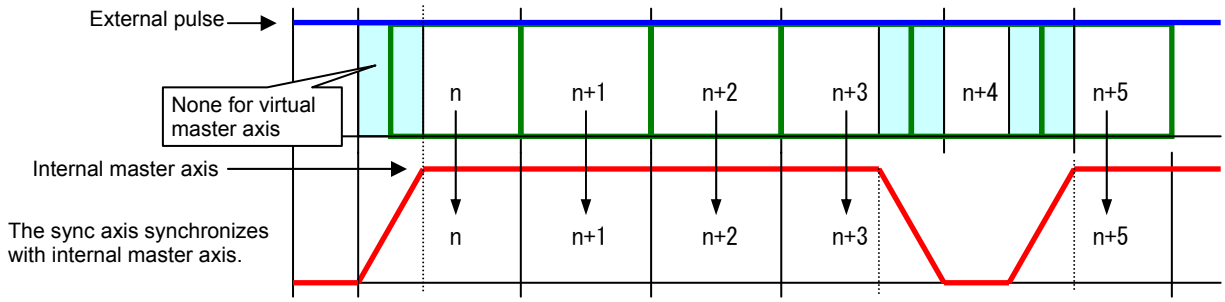
A value lower than 0 is assumed to be 0 and a value exceeding 2147483647 to be 2147483647.

(7) Travel at stop (+32, +33)

The deceleration of [Cycle stop] of the master axis is determined by this setting.

Setting range: 0 to 2147483647 [unit amount of master axis]

A value lower than 0 is assumed to be 0 and a value exceeding 2147483647 to be 2147483647.



(8) Master axis travel per cycle (+34, +35)

Set the master axis travel per cycle. This parameter is required for cycle stop of the master axis.
It is required when using [Sync cycle start].

Setting range: 0 to 2147483647 [unit amount of master axis]

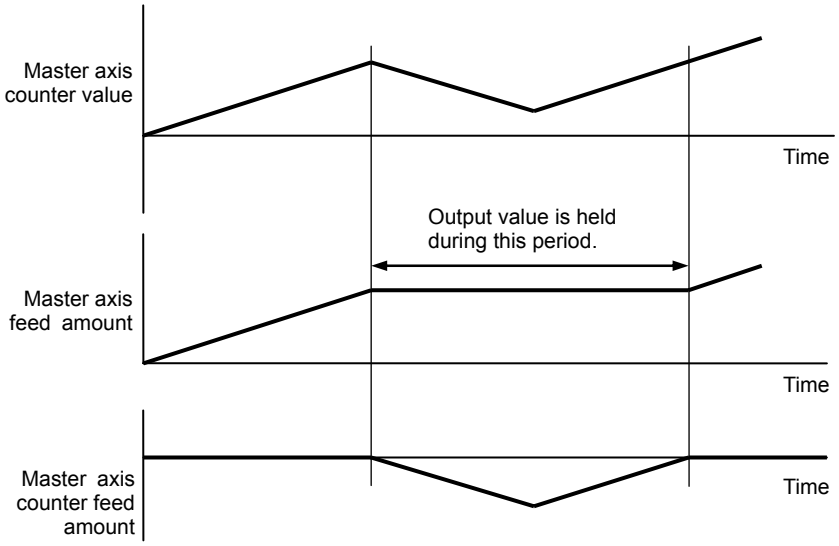
A value lower than 0 is assumed to be 0 and a value exceeding 2147483647 to be 2147483647.

(9) Reverse feed limiter (+36, +37)

If the master axis reverses within the length set here, the internal feed does not change. If exceeding the set length, a [Reverse rotation error] occurs.
It is required when using [Sync cycle start].

Setting range: 0 to 2147483647 [unit amount of master axis]

A value lower than 0 is assumed to be 0 and a value exceeding 2147483647 to be 2147483647.



3-4-3 External/Virtual master axis [Motion → Controller]

(1) External pulse input value (+0, +1)

The external pulse count value is displayed when the external pulse is selected for the master axis. This is a 32-bit ring counter. Even while the master axis is placed in a cycle stop state, this counts when there is a counter input.

Display range: -2147483648 to 2147483647 [pulses]

(2) Mark length measurement value (+8, +9)

During mark length measurement, the measured data is displayed. During mark compensation, this value becomes [Master axis travel per cycle].

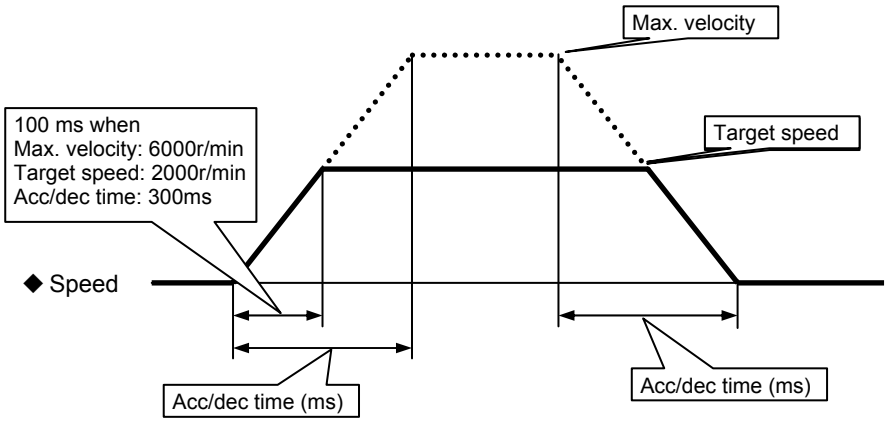
Display range: 0 to 2147483647 [unit amount of master axis]

3-4-4 Motion axis [Controller → Motion]

(1) Acceleration time (+10)

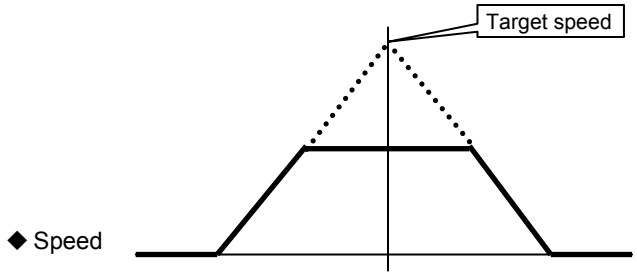
This is an acceleration /deceleration time of the motion axis during [Manual forward], [Manual reverse], or [PTP reference] operation. Set the time to reach the [Max. velocity].
It is not possible to set the acceleration and deceleration time separately.

Setting range: 0 to 3000 (ms)



The acceleration/deceleration time uses the moving average processing and internally has 600 levels of buffers.
The max. acceleration/deceleration time to reach the max. velocity is 600 levels × 5ms = 3000ms
When you want to make the acceleration gentler, decrease the max. velocity.

Note: If the travel is too small, the target speed may not be reached.

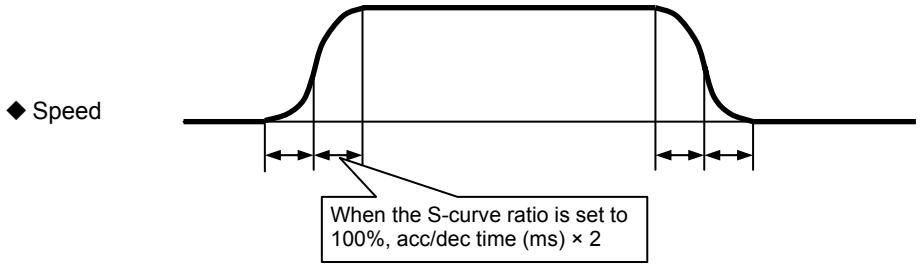


(2) S-curve ratio (+11)

S-curve acceleration/deceleration can be set.

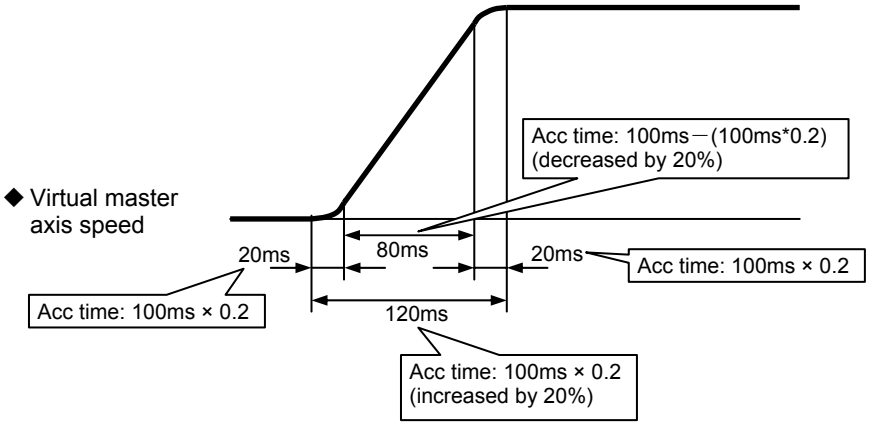
When the S-curve ratio is set to 100%, the acceleration/deceleration time is doubled.

Setting range: 0 to 100 (%)



<Calculation example>

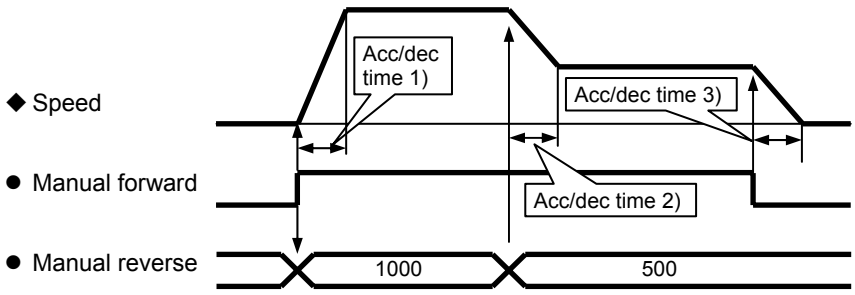
When acceleration time is set to 100ms and S-curve ratio to 20%



(3) Manual speed (+12, 13)

This is the target speed of [Manual forward] and [Manual reverse]. Data can be changed during operation.

Setting range: 0 to 2147483647 (unit amount/s)



The acceleration/deceleration times 1), 2), and 3) are the same. The acceleration speed varies.

(4) Motion control parameter (+14, to +39)

These parameters are related to motion operation.
The setting items are different depending on the motion function. For more information, refer to “Section 2 Motion Function Description.”
The setting items for each function are listed below.

	Ratio sync	Cycle sync	Rotary shear	Flying shear
Sync axis cycle setting	Ratio_Sync axis	Sync axis travel per cycle	Sync axis travel per cycle	
Master axis cycle setting	Ratio_Master axis	Master axis travel per cycle	Master axis travel per cycle	Master axis travel per cycle
Master axis min. cycle setting		Min. value of master axis travel per cycle	Min. value of master axis travel per cycle	Min. value of master axis travel per cycle
Reverse feed limiter		Reverse feed limiter	Reverse feed limiter	Reverse feed limiter
Travel at startup		Travel at startup	Travel at startup	Travel at startup
Travel at stop		Travel at stop	Travel at stop	Travel at stop
Master axis sync width			Master axis sync width	Master axis sync width
Sync axis sync width			Sync axis sync width	Sync axis sync width
Motion specific parameter 1		Delay at startup	Delay at startup	Delay at startup
Motion specific parameter 2		Min. value of sync axis travel per cycle	Acceleration length	Cut command delay
Motion specific parameter 3			Deceleration length	Cut command time
Motion specific parameter 4				Home position return speed
Motion specific parameter 5				

(5) Phase compensation length (+46, +47)

Set the travel for phase compensation. When [Phase compensation] is set ON, phase compensation is performed for the length set here.

Setting range: -2147483648 to 2147483647 [unit amount of master axis]

(6) Phase compensation upper limit (+48, +49)

Set the upper limit of phase compensation. For example, if the set value is 100 and [Phase compensation length] is 1000, compensation is performed in 10 cycles.

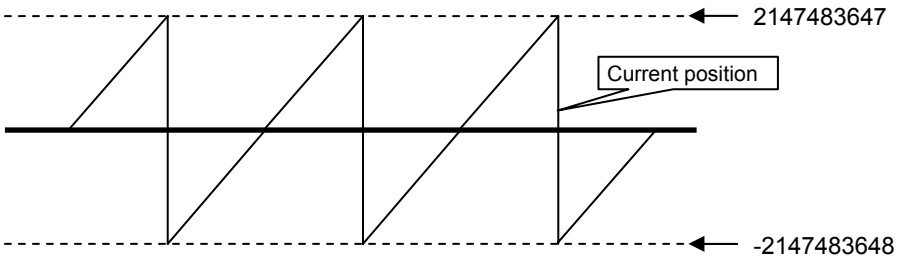
Setting range: 1 to Master axis cycle setting [unit amount of master axis]

A value lower than 1 is assumed to be 1 and a value exceeding master axis cycle setting/10 to be master axis cycle setting/10.

3-4-5 Motion axis [Motion → Controller]

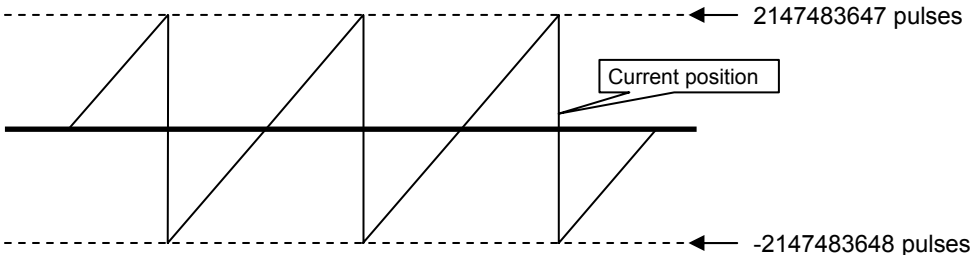
(1) Command position (+0, +1)

The command position of FALDIC is displayed. The unit is [Unit amount] or [Pulse] taking pulse correction into consideration. This is a ring counter whose display range is –2147483648 to 2147483647.



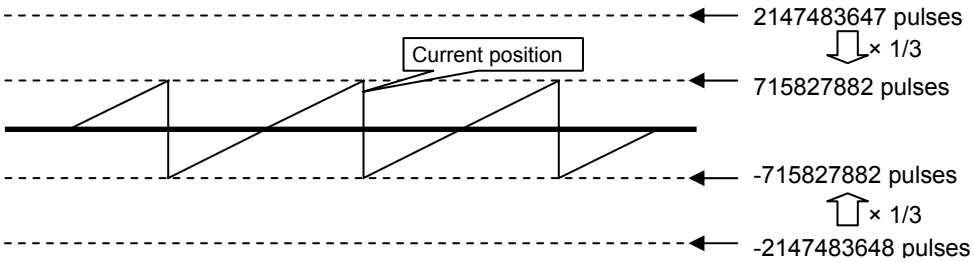
<Note>
The current position is internally controlled with 32-bit pulse.
When pulse correction value is displayed, the range is not –2147483648 to 2147483647.

- Internally controlled value



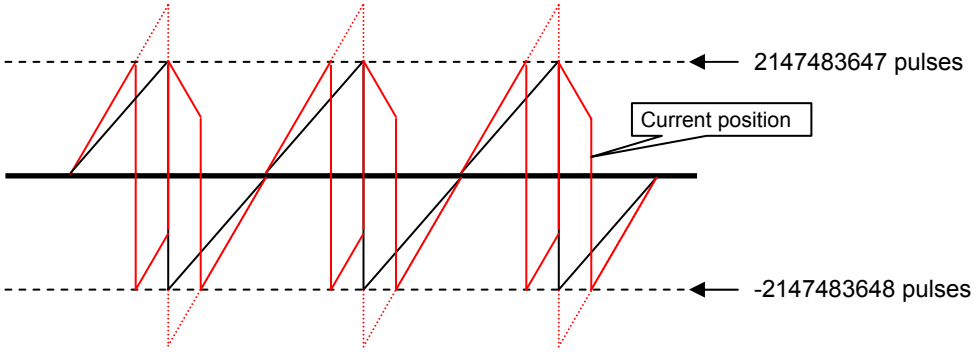
<When pulse correction is set to “1/3”>

- Displayed value



* The fractional part is discarded when displayed.

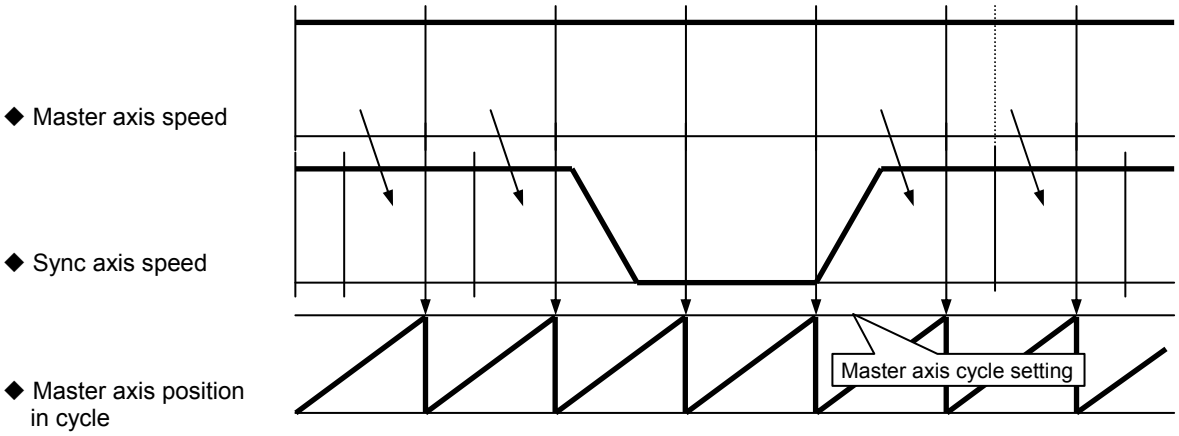
<When pulse correction is set to “2/3”>



Red line indicates the current position.
If the current position overflows using a pulse correction value, no correct value is displayed.
In this case, refer to “Master axis current position in a cycle”.

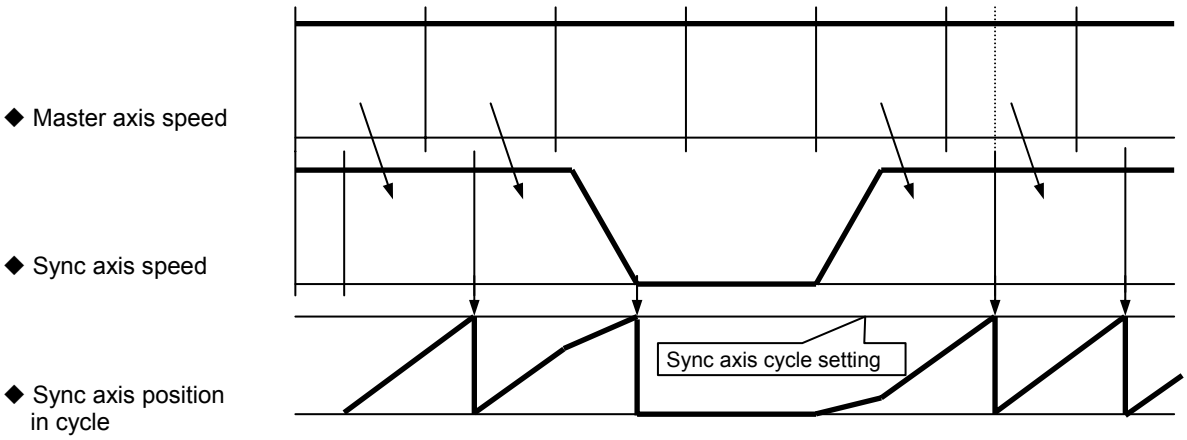
(2) Master axis position in cycle (+2, +3)

The master axis position during motion control except ratio synchronous.
The unit is [Unit amount] or [Pulse] considering pulse correction.



(3) Sync axis position in cycle (+4, +5)

The sync axis position during motion control except ratio synchronous.
The unit is [Unit amount] or [Pulse] considering pulse correction.



(4) Sync mode No. response (+6)

The currently selected motion function is displayed.

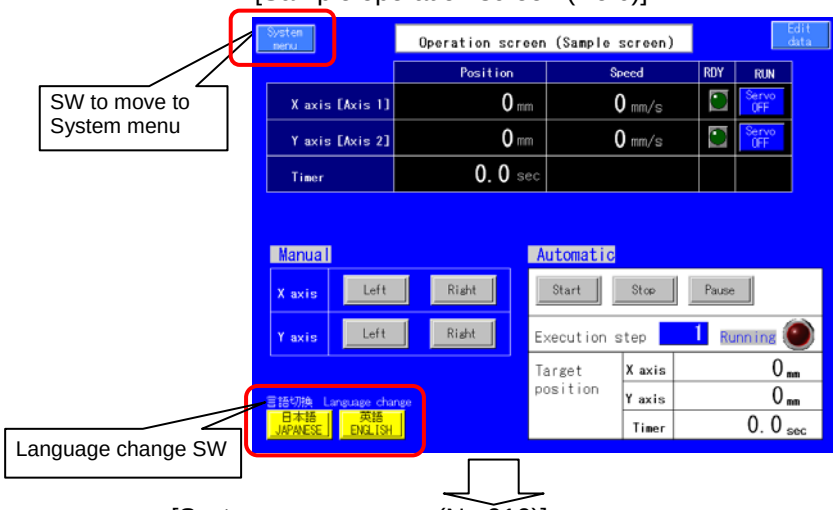
0: Single (PTP)
1: Ratio synchronous
2: Cycle synchronous
3: Rotary shear
4: Flying shear

Section 4 Screen Specification

4-1 System Menu Screen

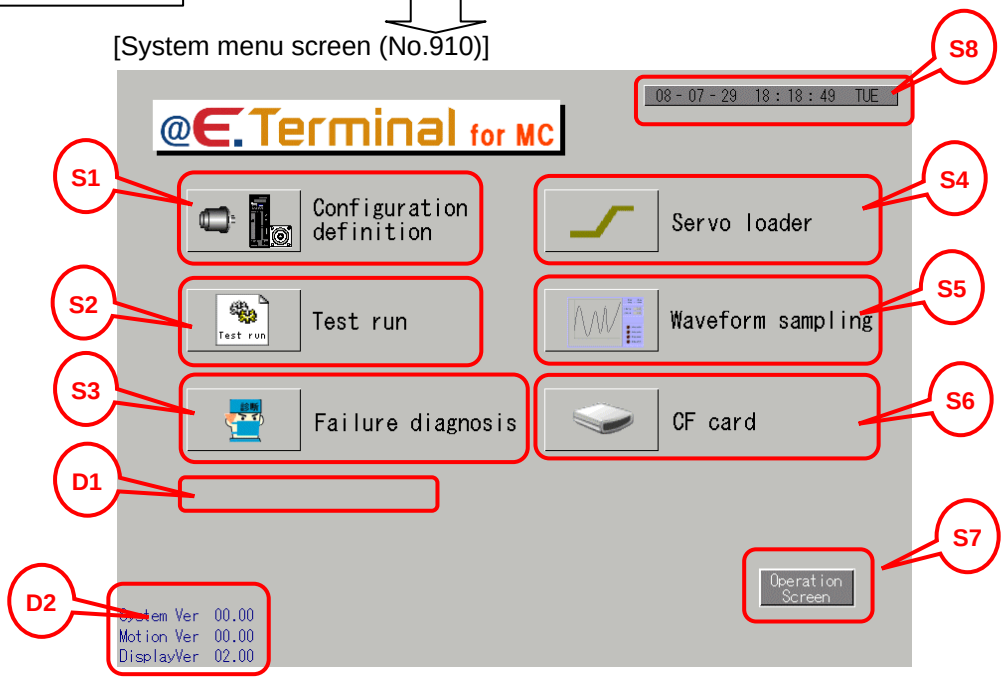
This screen is kind of home position to move to other screen.
If you make user operation screen, place SW to move to System menu screen.
[System menu] SW on below sample screen is used for this purpose.

[Sample operation screen (No.0)]



* If you turn on new unit, "Language selection" screen displayed. After select language, sample operation screen (No.0)

[System menu screen (No.910)]



[Screen specification]

Position	Name	Description
S1	Configuration definition	Move to Configuration definition screen (No.900).
S2	Test run	Move to Test run screen (No.945).
S3	Failure diagnosis	Move to failure diagnosis screen (No.930).
S4	Servo loader	Move to Servo loader screen (No.1020).
S5	Waveform sampling	Move to Waveform sampling screen (No.925).
S6	CF card	Move to CF card screen (No.955).
S7	Operation Screen	Move to Operation screen (No.0).
S8	Time setting	Move to Date and time setting screen (No.915).
D1	Alarm display	Message appear when alarm occurred. For more detail, see failure diagnosis.
D2	Version display	Display version of the built-in contents System: System definition of controller unit Motion: Built-in soft for controlling motion of controller unit Display: screen data of display part

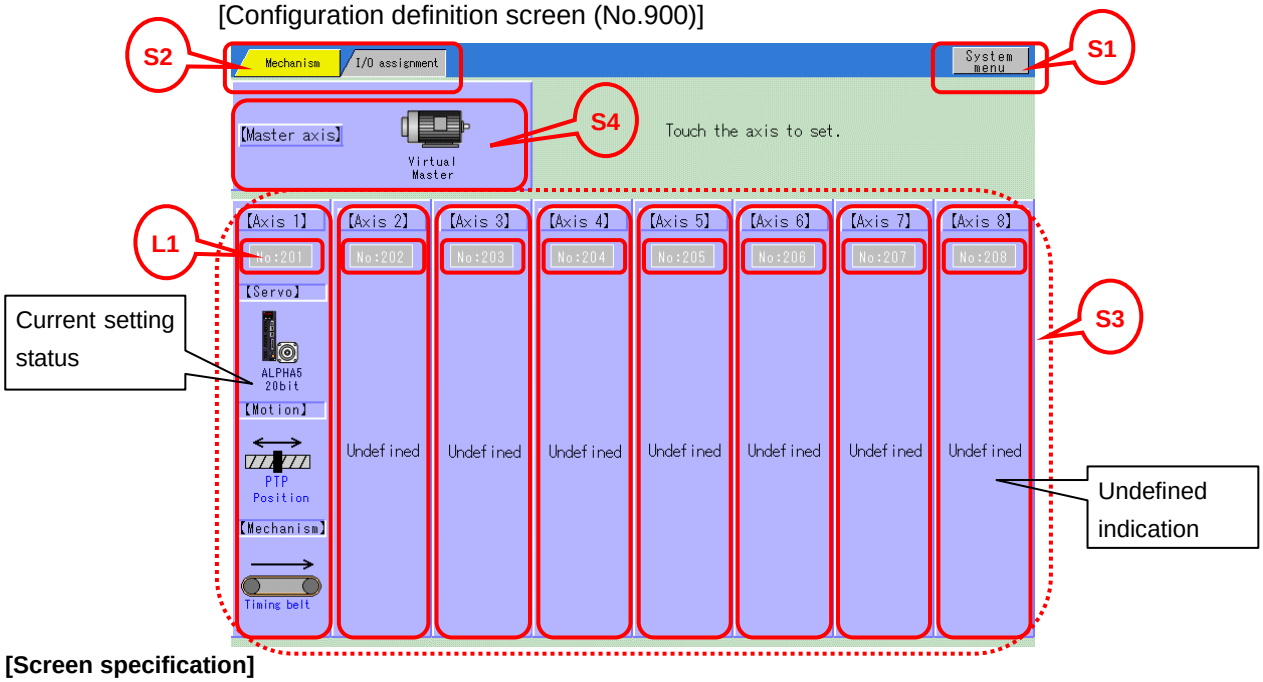
Section 4 Screen Specification

4-2 Configuration Definition

Make configuration definition used for @E.Terminal for MC.

When move from System menu screen, password entry is required.
(Password initial value is [0000].
(Enter [0] [0] [0] [0] [ENT])

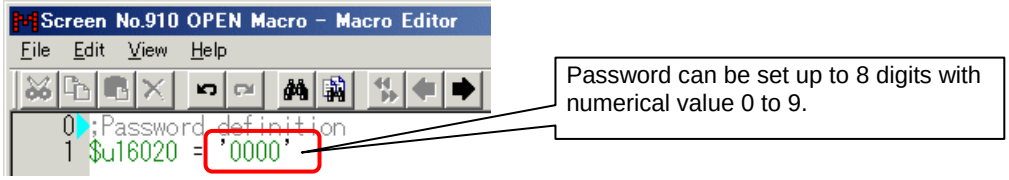
[Configuration definition screen (No.900)]



[Screen specification]

Position	Name	Description
S1	System menu	Move to System menu screen (No.910).
S2	Configuration definition screen selection	Select Configuration definition screen. [Mechanism], [I/O assignment]
S3	Selection status display (For each axis)	Status for each axis setting are shown.
		Touch screen that is alredy defined. ->Move to Mechanism setting screen (No.905),
		Touch screen that is not defined. ->It is considered to create new definition, and move to Select servo screen (No.960).
S4	Master axis selection status	Master axis selection status is shown. If you touch screen, move to Master axis setting screen (No.901).
L1	Configuration display	Lamp goes ON when servo is connected.

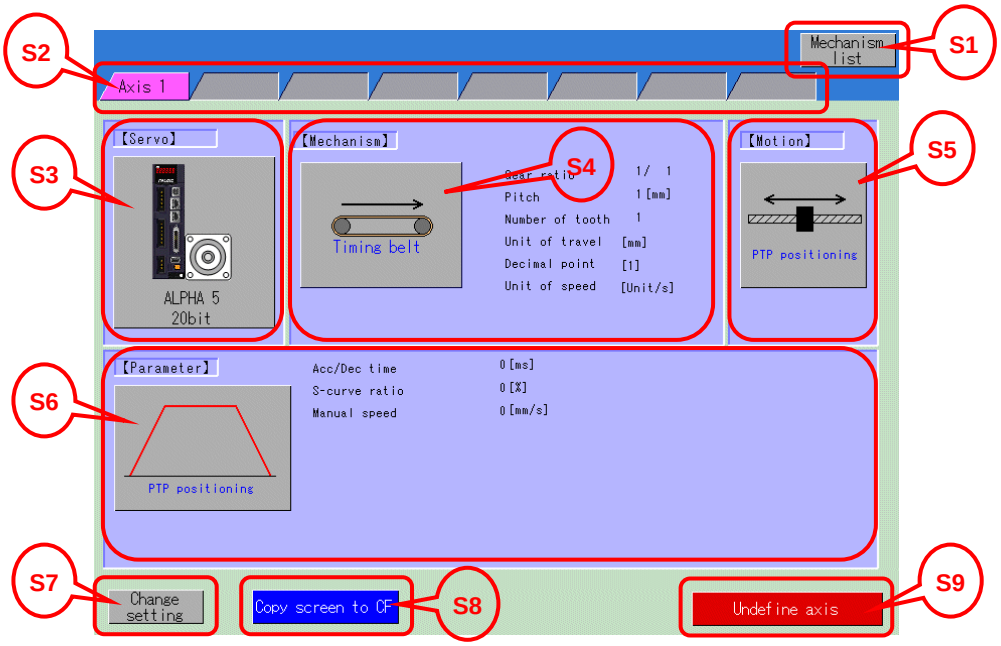
* To change password, change open macro program of screen No.910.


Screen No.910 OPEN Macro - Macro Editor
File Edit View Help
0 ;Password definition
1 $u16020 = '0000'
Password can be set up to 8 digits with numerical value 0 to 9.

Section 4 Screen Specification

4-2-1 Mechanism change screen (No.905)

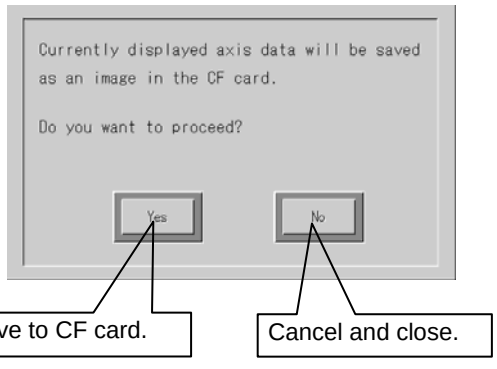
Change mechanism or parameter that is alredy defined. Or you can delete mechanism.



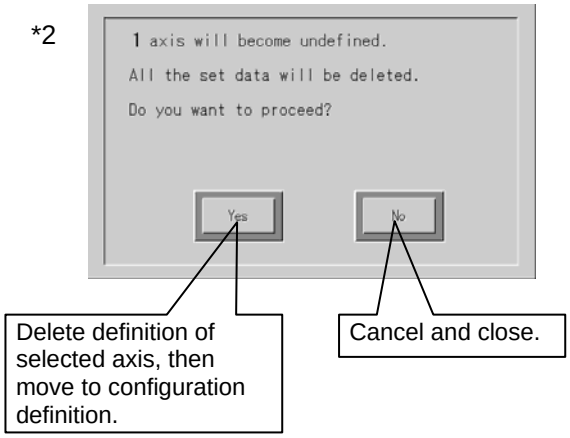
[Screen specification]

Position	Name	Description
S1	Mechanism list	Move to configuration definition screen (No.900).
S2	Axis change	Change axis to be displayed. Only defined axis can be selected.
S3	Servo select	Display selected servo. If you touch it, move to Select servo screen (No.960).
S4	Mechanism select	Display selected mechanism. If you touch it, move to Select mechanism screen (No.963).
S5	Motion select	Display selected motion. If you touch it, move to Select motion screen (No.961).
S6	Parameter	Display selected parameter setting. If you touch it, move to Parameter setting screen (No.964).
S7	Change setting	Execute wizard again. Move to Select servo screen (No.960).
S8	Copy screen to CF	Copy displayed screen into CF card. Confirmation screen appear (*1), If you push [YES], save to CF card. Saved to \MOTION8\HDCOPY\HD905~**.JPG folder (** is axis No.).
S9	Undefine axis	Delete definition of selected axis. Confirmation screen appear (*2).

*1


Currently displayed axis data will be saved as an image in the CF card.
Do you want to proceed?
Yes
No
Save to CF card.
Cancel and close.

*2

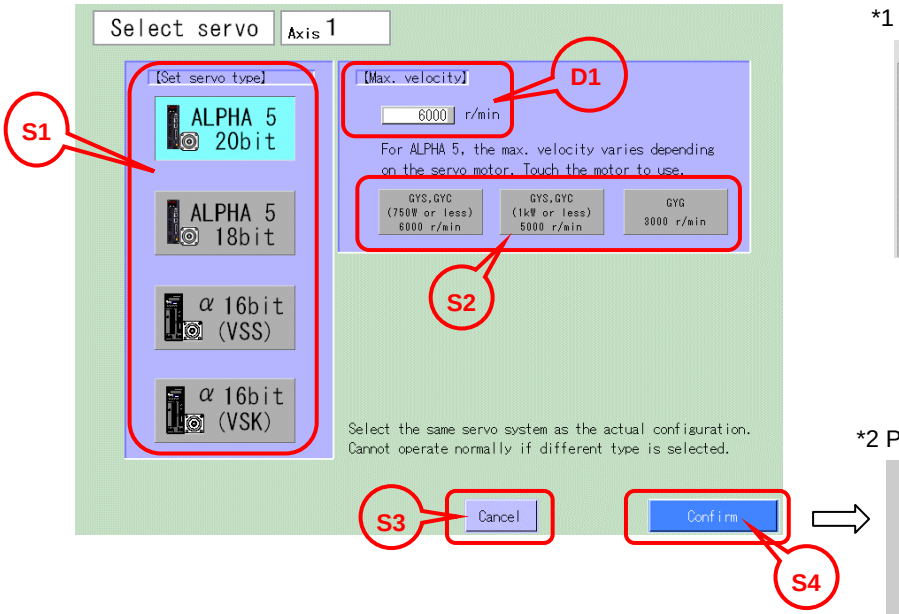

1 axis will become undefined.
All the set data will be deleted.
Do you want to proceed?
Yes
No
Delete definition of selected axis, then move to configuration definition.
Cancel and close.

Section 4 Screen Specification

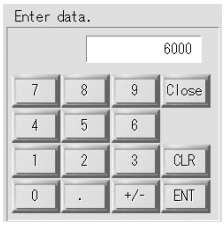
4-2-2 Select servo screen (No.960)

Select servo.

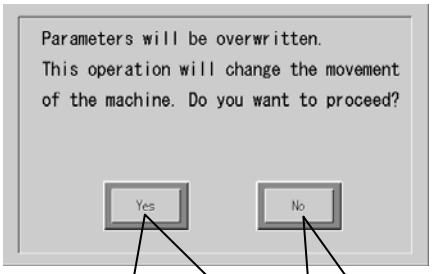
[When change servo]



*1 Data entry screen



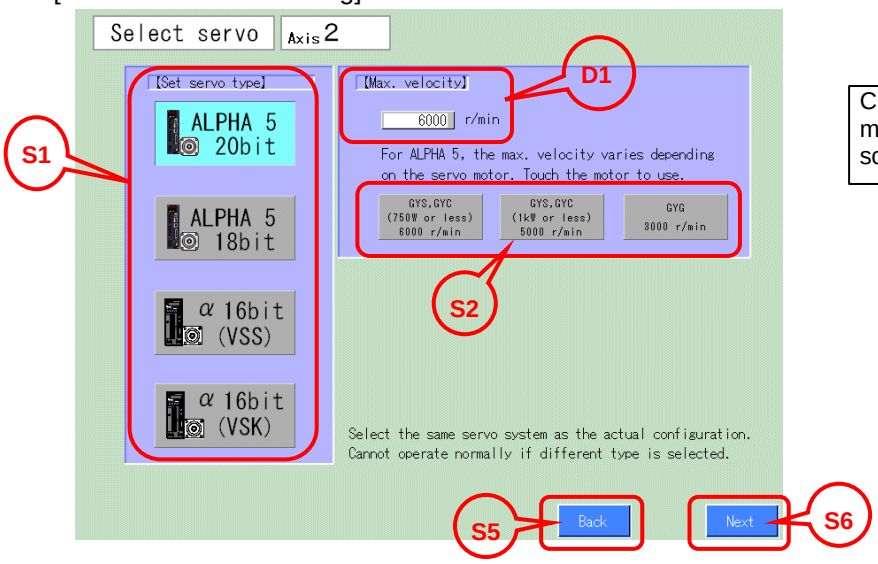
*2 Parameter change confirmation screen



Change parameter, then move to mechanism screen.

Cancel and close.

[When create new setting]



[Screen specification]

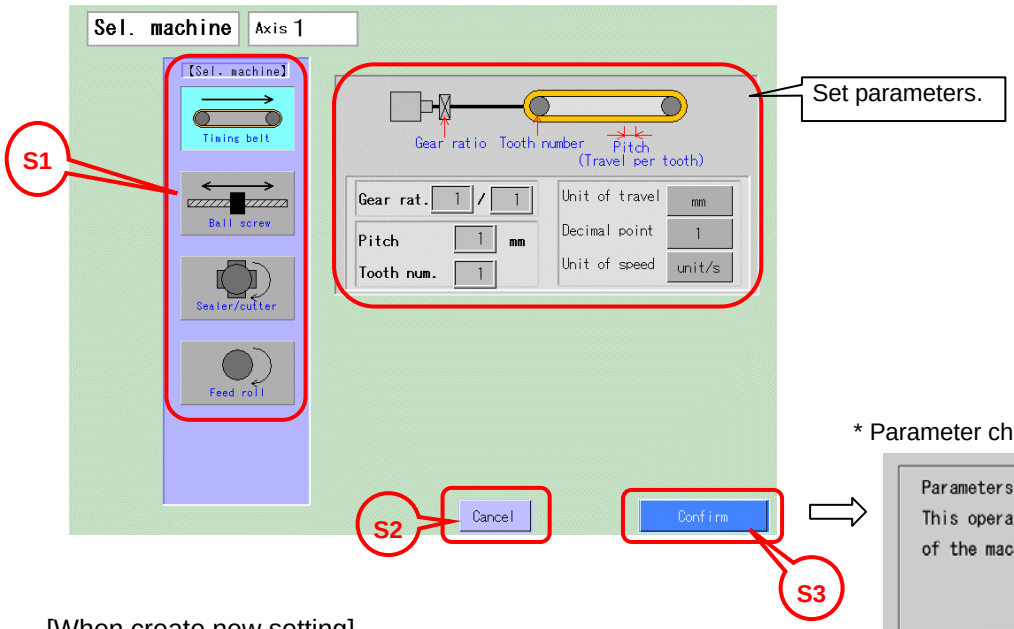
Position	Name	Description
S1	Set servo type	Select servo encorder type from next. [ALPHA5 20bit], [ALPHA5 18bit], [α16bit(VSS)], [α 16bit(VSK)]
D1	Max. verocity	Input maximum verocity. Touch here to open data entry screen (*1).
S2	Select Max. RPM	In case of ALPHA5, maximum RPM is automatically set by selecting servo motor.
S3	Cancel	Back to mechanism change screen (No.905).
S4	Confirm	Parameter change confirmation screen displayed (*2). If you select [YES], back to mechanism change screen (No.905).
S5	Back	Back to Configuration definition screen (No.900) or Mechanism change screen (No.905).
S6	Next	Move to Select mechanism screen (No.963).

Section 4 Screen Specification

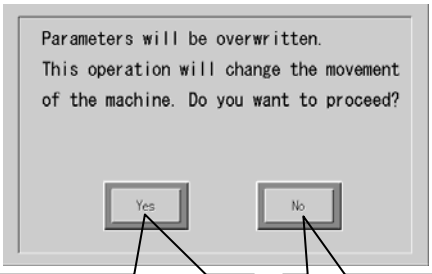
4-2-3 Mechanism select screen (No.963)

Select mechanism.

[When change mechanism]



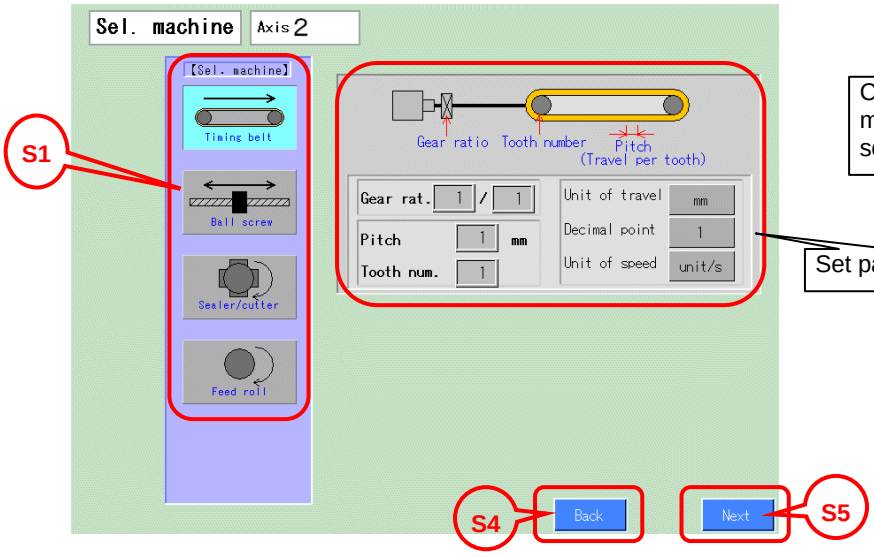
* Parameter change confirmation screen



Change parameter, then move to mechanism screen.

Cancel and close.

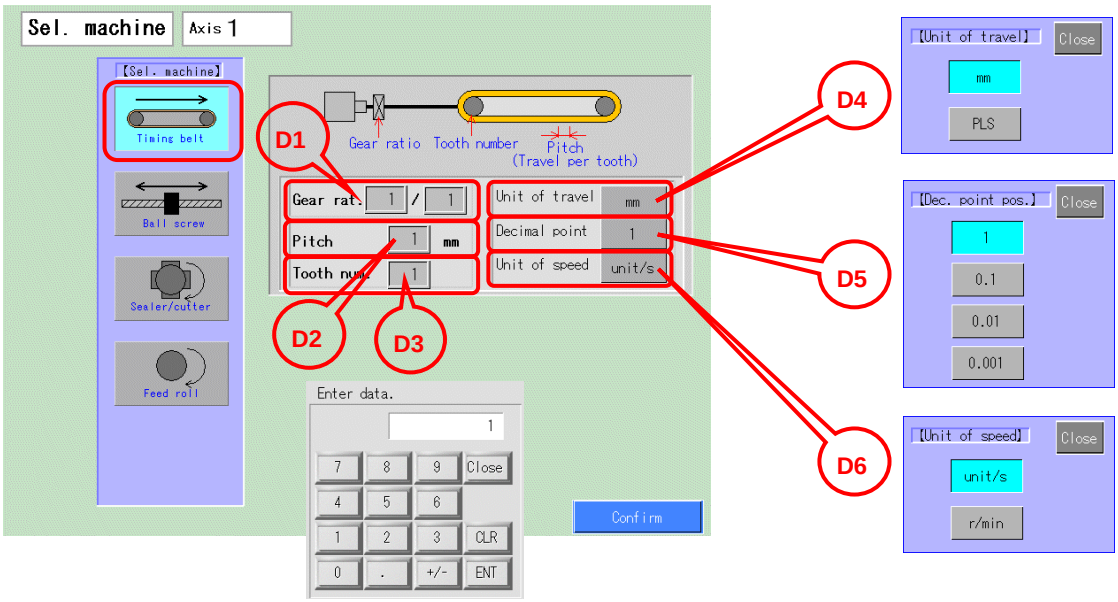
[When create new setting]



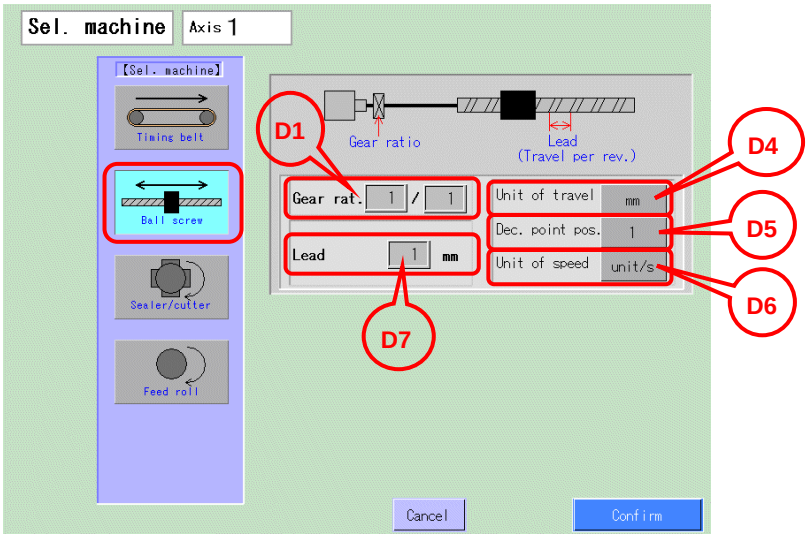
[Screen specification]

Position	Name	Description
S1	Select mechanism	Select mechanism from next. [Timing belt], [Ball screw], [Sealer/cutter], [Feed roll]
S2	Cancel	Back to mechanism change screen (No.905).
S3	Confirm	Parameter change confirmation screen displayed (*). If you select [YES], back to mechanism change screen (No.905).
S4	Back	Back to Select servo screen (No.960).
S5	Next	Move to Select motion screen (No.961).

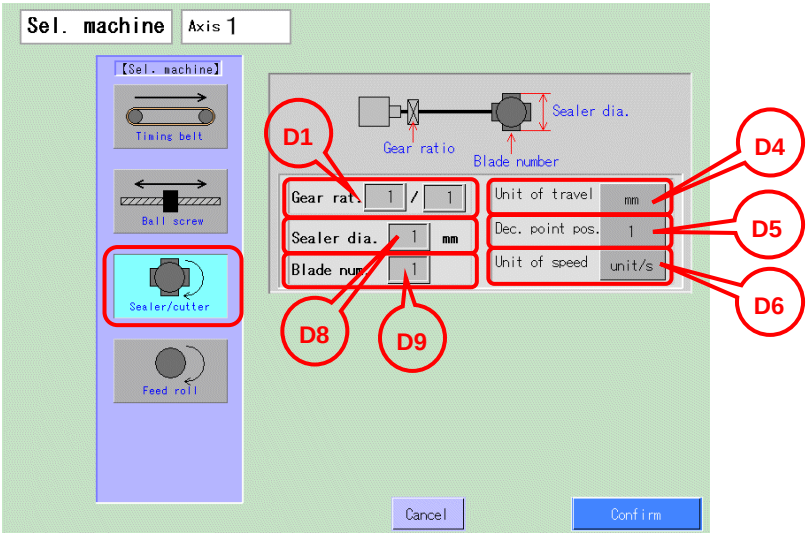
[Timing belt]



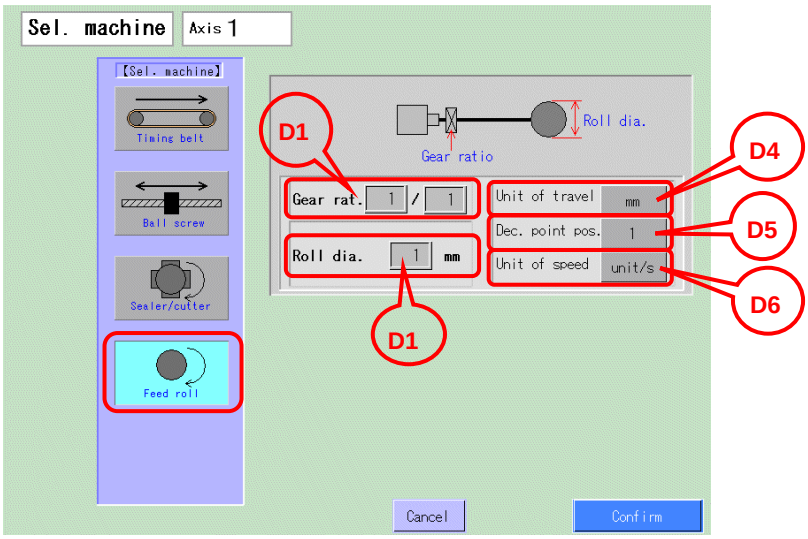
[Ball screw]



[Sealer/cutter]



[Feed roll]



[Screen specification]

Position	Name	Description	
D1	Gear ratio	Set gear ratio. Range : [1 to 999] / [1 to 999]	*1
D2	Pitch	Set travel per tooth. Range : 1 to 999(mm)	*1
D3	Tooth number	Set tooth number. Range : 1 to 999	*1
D4	Unit of travel	Select unit of travel from below. [mm], [PLS]	*2
D5	Decimal point	Select decimal point of travel from below. [1], [0.1], [0.01], [0.001]	*2
D6	Unit of speed	Select unit of speed from below. [unit/s], [r/min]	*2
D7	Lead	Set travel per rotation. Range : 1 to 999 (mm)	*1
D8	Sealer diameter	Set sealer diameter. Range : 1 to 999 (mm)	*1
D9	Blade number	Set blade number. Range : 1 to 999	*1
D10	Roll diameter	Set roll diameter. Range : 1 to 999 (mm)	*1

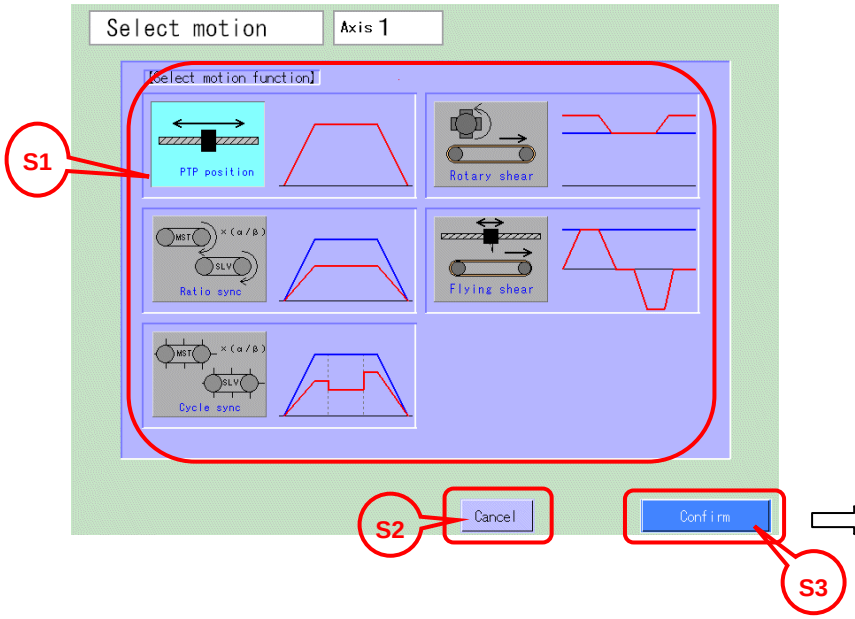
*1 If you touch screen, data entry screen appears.
*2 If you touch screen, select screen appears.

Section 4 Screen Specification

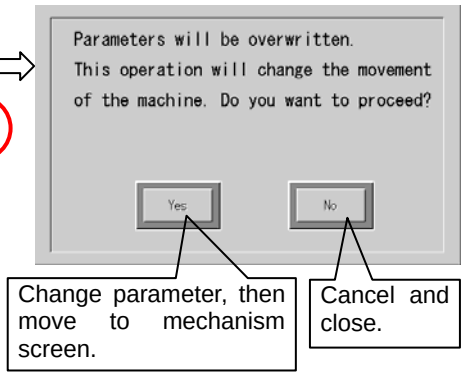
4-2-4 Select motion screen (No.961)

Select motion function

[When change motion]



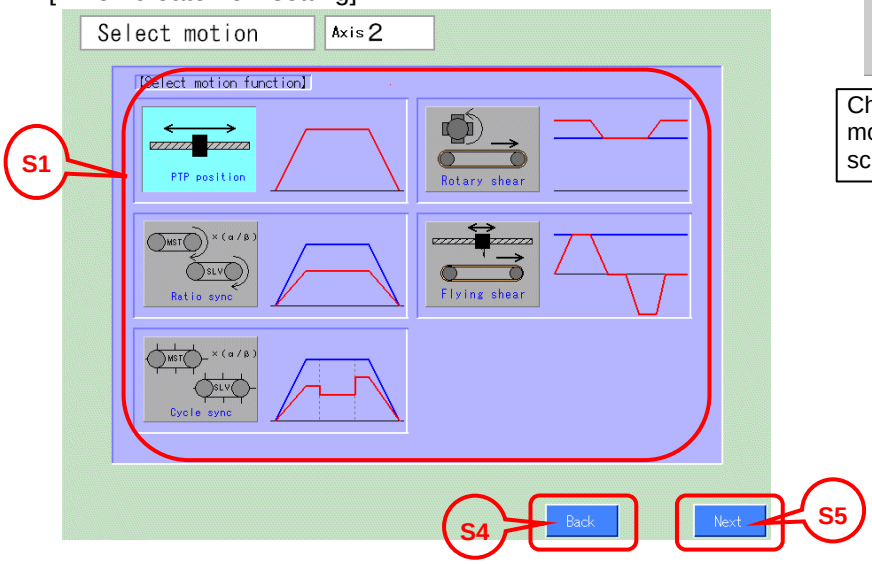
* Parameter change confirmation screen



Change parameter, then move to mechanism screen.

Cancel and close.

[When create new setting]



[Screen specification]

Position	Name	Description
S1	Select motion function	Select motion function from below. [PTP position], [Ratio sync], [Cycle sync], [Rotary shear], [Flying shear]
S2	Cancel	Back to mechanism change screen (No.905).
S3	Confirm	Parameter change confirmation screen displayed (*). If you select [YES], back to mechanism change screen (No.905).
S4	Back	Back to Mechanism select screen (No.963).
S5	Next	Move to parameter setting screen (No.964).

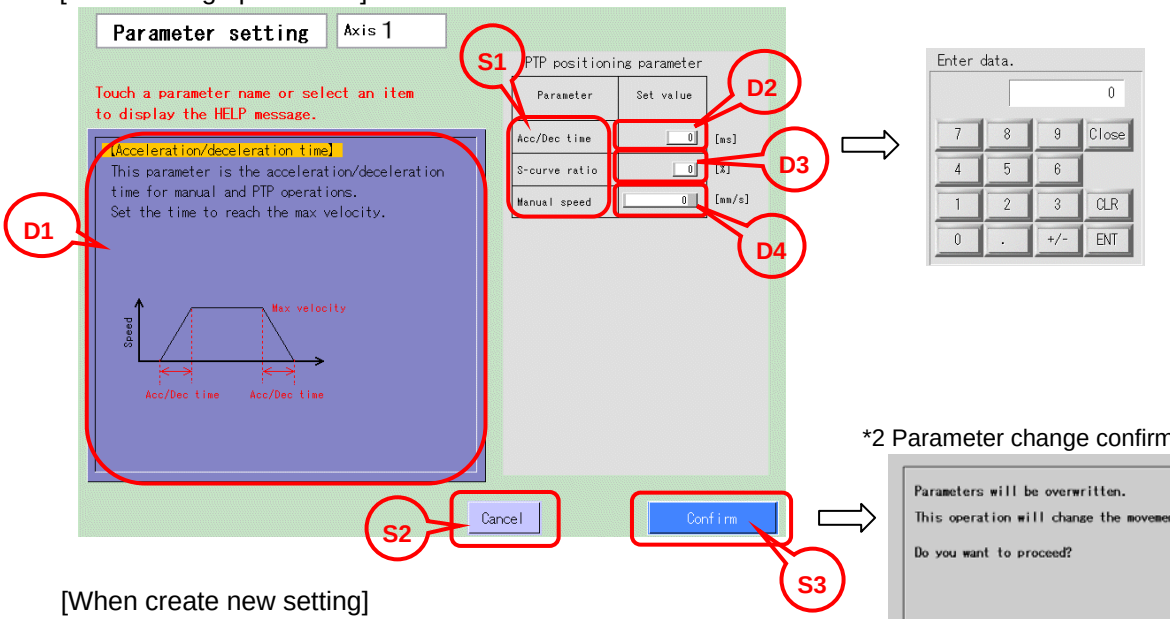
Section 4 Screen Specification

4-2-5 Parameter setting screen (No.964)

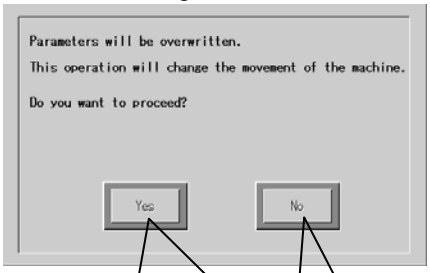
Set parameters related to selected motion.

(1) PTP positioning parameter

[When change parameter]



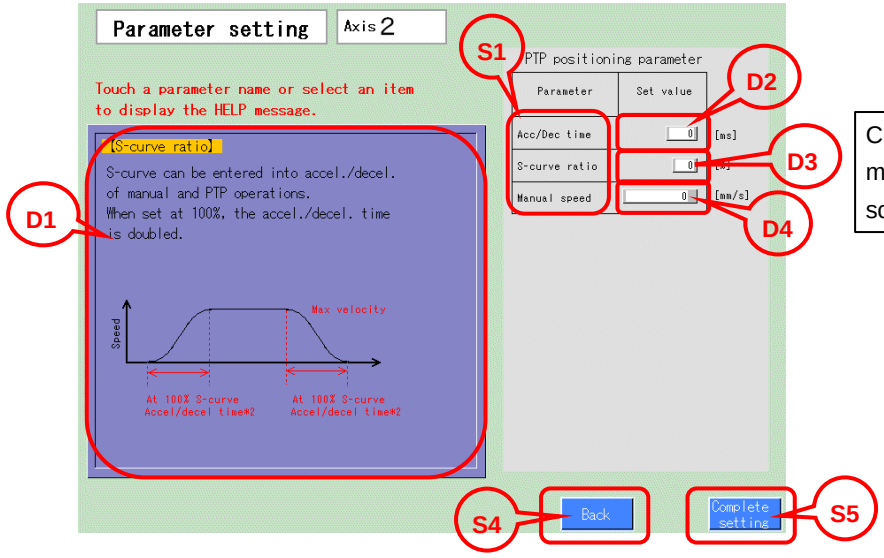
*2 Parameter change confirmation screen



Change parameter, then move to mechanism screen.

Cancel and close.

[When create new setting]



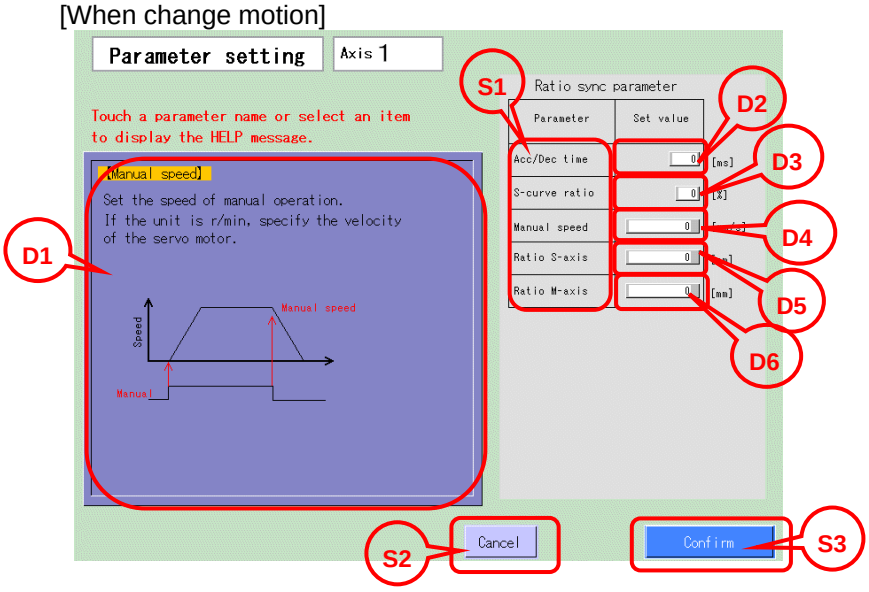
[Screen specification]

Position	Name	Description
S1	Parameter	Touch a parameter name or select an item to display the HELP message.
D1	HELP message	
D2	Acc/Dec time	Set Acceleration/Deceleration time. Range : 0 to 3000(ms) *1
D3	S-curve ratio	Set S-curve ratio. Range : 0 to 100(%) *1
D4	Manual speed	Set manual speed. Range : 0 to 2147483647(mm/s) *1
S2	Cancel	Back to mechanism change screen (No.905).
S3	Confirm	Parameter change confirmation screen displayed (*2). If you select [YES], back to mechanism change screen (No.905).
S4	Back	Back to Select motion screen (No.961).
S5	Complete setting	Parameter change confirmation screen displayed (*2). If you select [YES], back to Mechanism change screen (No.905).

*1 If you touch screen, data entry screen appears.

(2) Ratio synchronization parameter

[When change motion]



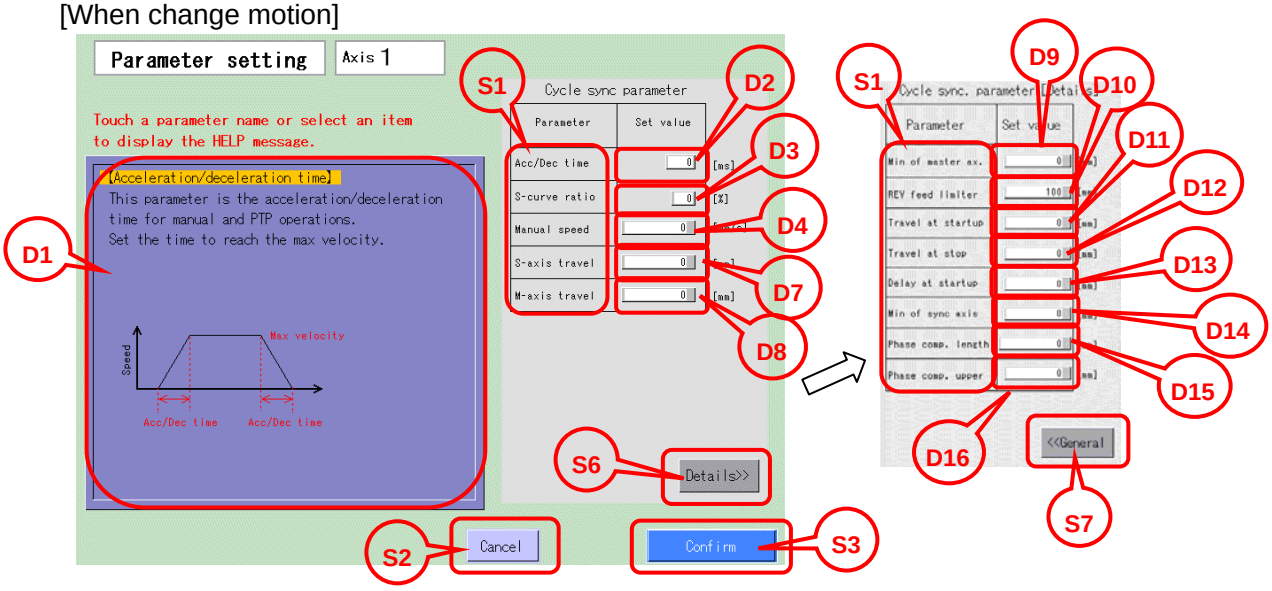
[Screen specification]

Position	Name	Description	
S1	Parameter	Touch a parameter name or select an item to display the HELP message.	
D1	HELP message		
D2	Acc/Dec time	Set Acceleration/Deceleration time. Range : 0 to 3000(ms)	*1
D3	S-curve ratio	Set S-curve ratio. Range : 0 to 100(%)	*1
D4	Manual speed	Set manual speed. Range : 0 to 2147483647(mm/s)	*1
D5	Ratio Sync axis	Set Ratio on Sync axis. Range : 0 to 2147483647(mm)	*1
D6	Ratio Master axis	Set Ratio on Master axis. Range : 1 to 2147483647(mm)	*1
S2	Cancel	Back to mechanism change screen (No.905).	
S3	Confirm	Parameter change confirmation screen displayed. If you select [YES], back to mechanism change screen (No.905).	

*1 If you touch screen, data entry screen appears.

(3) Cycle syncronization parameter

[When change motion]



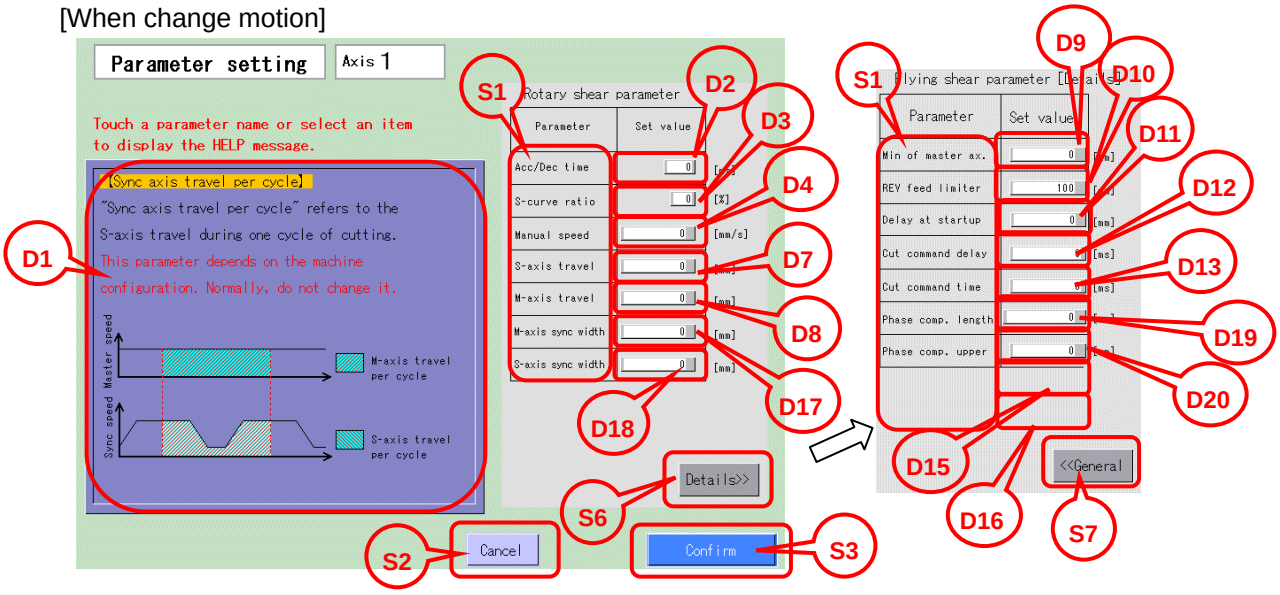
[Screen specification]

Position	Name	Description
S1	Parameter	Touch a parameter name or select an item to display the HELP message.
D1	HELP message	
D2	Acc/Dec time	Set Acceleration/Deceleration time. Range : 0 to 3000(ms) *1
D3	S-curve ratio	Set S-curve ratio. Range : 0 to 100(%) *1
D4	Manual speed	Set manual speed. Range : 0 to 2147483647(mm/s) *1
D7	Sync axis travel per cycle	Set Sync axis travel per cycle. *1 Range : 1 to 2147483647
D8	Master axis travel per cycle	Set Master axis travel per cycle. *1 Range : 1 to 2147483647
D9	Min value of master travel per cycle	Set Min value of master travel per cycle. *1 Range : 0 to 2147483647
D10	Reverse feed limiter	Set limiter value when Master axis reverse rotation. *1 Range : 0 to 2147483647
D11	Travel at startup	Set travel length when start sync or after release cycle stop. *1 Range : 0 to Master axis travel per cycle.
D12	Travel at stop	Set travel length after cycle stop. *1 Range : 0 to Master axis travel per cycle.
D13	Delay at startup	Set delay at startup. Range : 0 to 2147483647 *1
D14	Min value of sync axis travel per cycle	Set min value of sync axis travel per cycle. *1 Range : 0 to 2147483647
D15	Phase compensation length	Set phase compensation travel length. *1 Range : -2147483648 to 2147483647
D16	Phase compensation upper limit	Set upper limit of phase compensation per cycle. *1 Range : 0 to master axis travel per cycle/10
S2	Cancel	Back to mechanism change screen (No.905).
S3	Complete setting	Parameter change confirmation screen displayed. If you select [YES], back to Mechanism change screen (No.905).
S6	Details	Changes to Detail parameter screen.
S7	General	Changes to General parameter screen.

*1 If you touch screen, data entry screen appears.

(4) Rotary shear parameter

[When change motion]



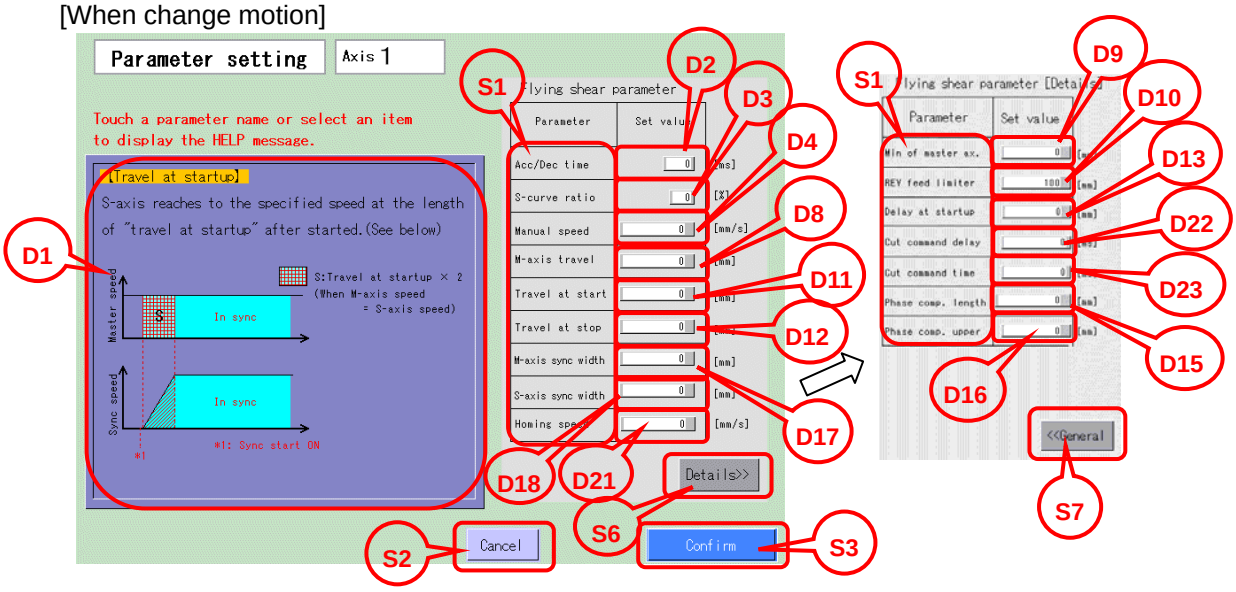
[Screen specification]

Position	Name	Description
S1	Parameter	Touch a parameter name or select an item to display the HELP message.
D1	HELP message	
D2	Acc/Dec time	Set Acceleration/Deceleration time. Range : 0 to 3000(ms) *1
D3	S-curve ratio	Set S-curve ratio. Range : 0 to 100(%) *1
D4	Manual speed	Set manual speed. Range : 0 to 2147483647(mm/s) *1
D7	Sync axis travel per cycle	Set Sync axis travel per cycle. *1 Range : 1 to 2147483647
D8	Master axis travel per cycle	Set Master axis travel per cycle. *1 Range : 1 to 2147483647
D9	Min value of master travel per cycle	Set Min value of master travel per cycle. *1 Range : 0 to 2147483647
D10	Reverse feed limiter	Set limiter value when Master axis reverse rotation. *1 Range : 0 to 2147483647
D11	Travel at startup	Set travel length when start sync or after release cycle stop. *1 Range : 0 to Master axis travel per cycle.
D12	Travel at stop	Set travel length after cycle stop. *1 Range : 0 to Master axis travel per cycle.
D13	Delay at startup	Set delay at startup. Range : 0 to 2147483647 *1
D15	Phase compensation length	Set Phase compensation length travel. *1 Range : -2147483648 to 2147483647
D16	Phase compensation upper limit	Set Phase compensation upper limit per cycle. *1 Range : 0 to Master axis travel per cycle/10
D17	Master axis synchronization width	Set length of synchronization of Master axis with Sync axis. *1 Range : 0 to 2147483647
D18	Sync axis synchronization width	Set length of synchronization of Sync axis with Master axis. *1 Range : 0 to 2147483647
D19	Acceleration length	Set the master axis travel amount during acceleration (or deceleration) made in the transition between sync and async. Range : 0 to 2147483647 *1
D20	Deceleration length	Set the master axis travel amount during acceleration (or deceleration) made in the transition between sync and async. Range : 0 to 2147483647 *1
S2	Cancel	Back to mechanism change screen (No.905).
S3	Complete setting	Parameter change confirmation screen displayed. If you select [YES], back to Mechanism change screen (No.905).
S6	Detail	Changes to Detail parameter screen.
S7	General	Changes to General parameter screen.

*1 If you touch screen, data entry screen appears.

(5) Flying shear parameter

[When change motion]



[Screen specification]

Position	Name	Description
S1	Parameter	Touch a parameter name or select an item to display the HELP message.
D1	HELP message	
D2	Acc/Dec time	Set Acceleration/Deceleration time. Range : 0 to 3000(ms) *1
D3	S-curve ratio	Set S-curve ratio. Range : 0 to 100(%) *1
D4	Manual speed	Set manual speed. Range : 0 to 2147483647(mm/s) *1
D8	Master axis travel per cycle	Set Master axis travel per cycle. Range : 1 to 2147483647 *1
D9	Min value of master travel per cycle	Set Min value of master travel per cycle. Range : 0 to 2147483647 *1
D10	Reverse feed limiter	Set limiter value when Master axis reverse rotation. Range : 0 to 2147483647 *1
D11	Travel at startup	Set the master axis travel amount while the sync axis is accelerating. Range : 0 to 2147483647 *1
D12	Travel at stop	Set the master axis travel amount while the sync axis is decelerating. Range : 0 to 2147483647 *1
D13	Delay at startup	Set delay at startup. Range : 0 to 2147483647 *1
D15	Phase compensation length	Set Phase compensation length travel. Range : -2147483648 to 2147483647 *1
D16	Phase compensation upper limit	Set Phase compensation upper limit per cycle. Range : 0 to Master axis travel per cycle/10 *1
D17	Master axis synchronization width	Set length of synchronization of Master axis with Sync axis. Range : 0 to 2147483647 *1
D18	Sync axis synchronization width	Set length of synchronization of Sync axis with Master axis. Range : 0 to 2147483647 *1
D21	Home position return speed	Set the speed of return operation. Range : 0 to 2147483647 *1
D22	Cut command delay	Set the value of cut output delay time. Range : 0 to 2147483647 *1
D23	Cut command time	Set the value of cut output ON time. Range : 0 to 2147483647 *1
S2	Cancel	Back to mechanism change screen (No.905).
S3	Complete setting	Parameter change confirmation screen displayed. If you select [YES], back to Mechanism change screen (No.905).
S6	Detail	Changes to Detail parameter screen.
S7	General	Changes to General parameter screen.

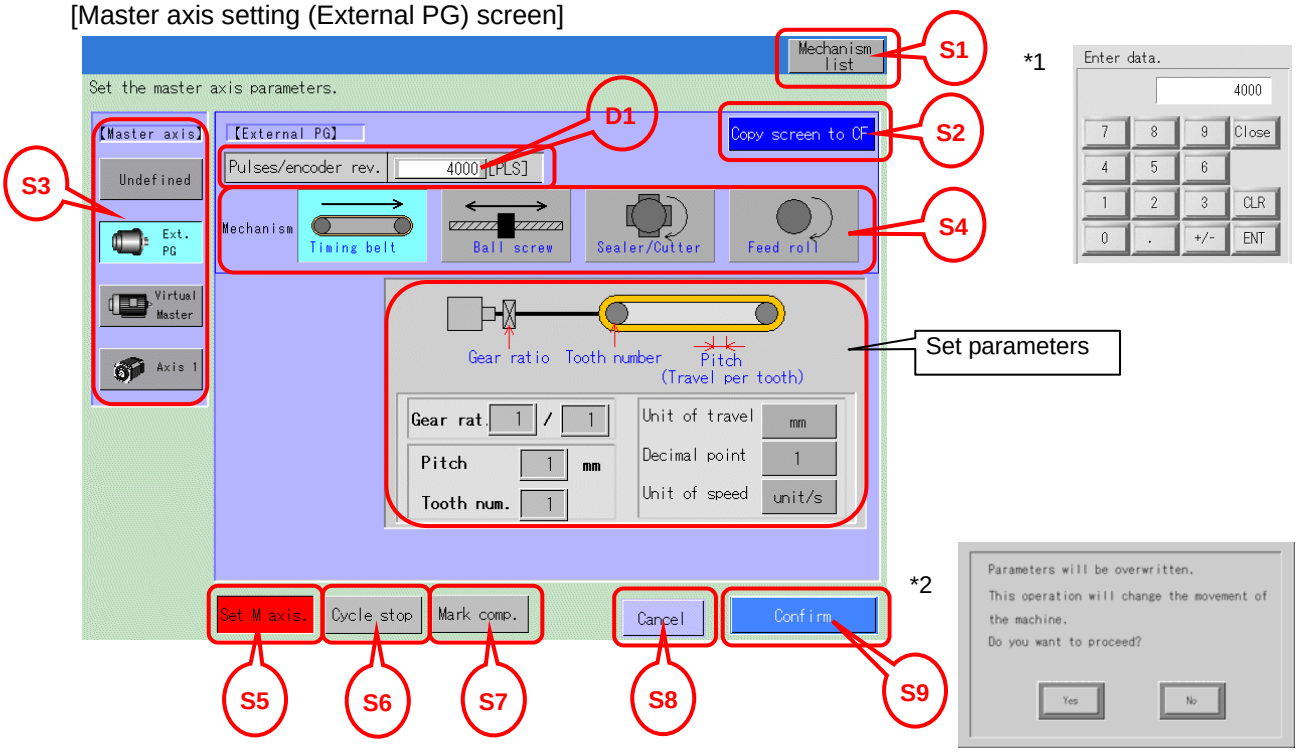
*1 If you touch screen, data entry screen appears.

Section 4 Screen Specification

4-2-6 Master axis setting screen (No.901)

Set parameters related to Master axis.

[Master axis setting (External PG) screen]



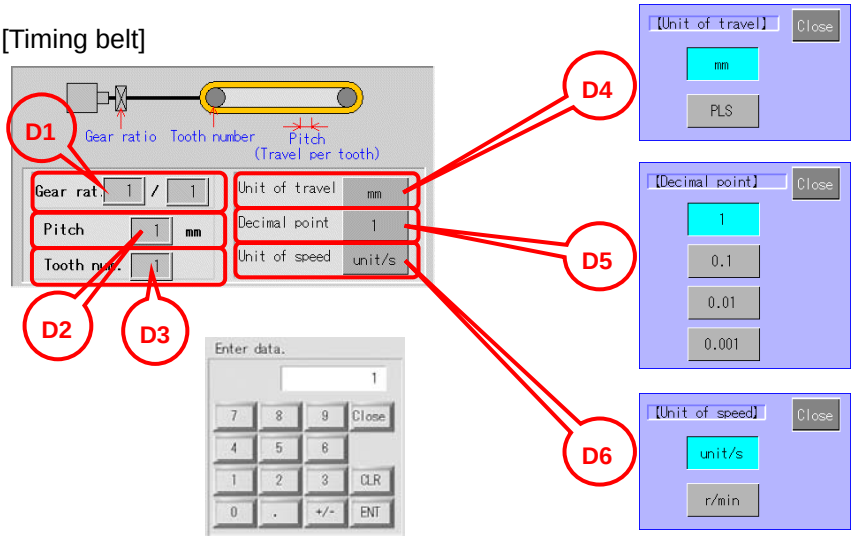
[Screen specification]

Position	Name	Description
S1	Mechanism list	Move to configuration definition screen (No.900).
S2	Copy screen to CF	Copy displayed screen into CF card. Confirmation screen appear. If you push [YES], save to CF card. Saved to \MOTION8\HDCOPY\HD901~**.JPG folder. ** is 00 : Master axis, 01 : Cycle stop, 02 : Mark comp.
S3	Master axis	Select master axis from below. [Undefined], [Ext.PG], [Virtual Master], [Axis 1]
D1	Pulses/encorder rev.	Set number of pulse of encorder one rotation. If you touch, data entry screen will appear (*1). Range : 1 to 1048576(PLS)
S4	Mechanism	Select mechanism from below. [Timing belt], [Ball screw], [Sealer/Cutter], [Feed roll]
S5	Set M axis.	Back to Master axis setting screen from Cycle stop screen or Mark compensation setting screen.
S6	Cycle stop	Move to Cycle stop setting screen.
S7	Mark comp.	Move to Mark compensation screen.
S8	Cancel	Back to Configuration definition screen (No.900).
S9	Confirm	Parameter change confirmation screen displayed (*2). If you select [YES], back to Configuration definition screen (No.900).

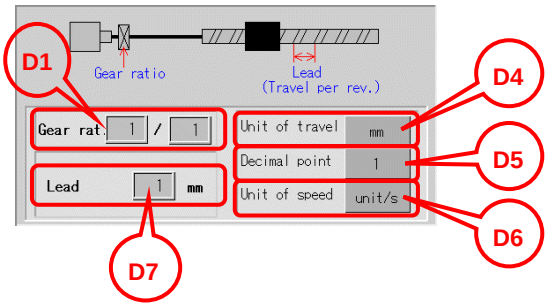
Section 4 Screen Specification

[Each mechanism setting of external PG]

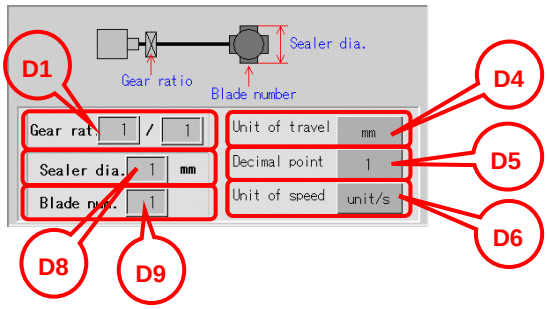
[Timing belt]



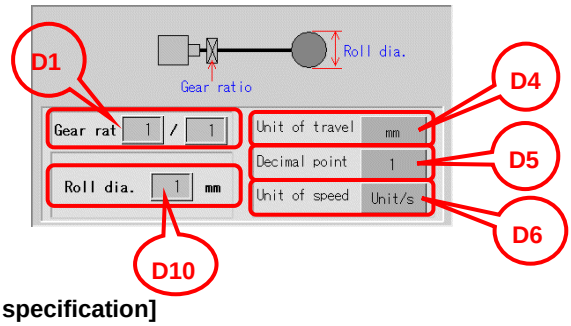
[Ball screw]



[Sealer/Cutter]



[Feed roll]



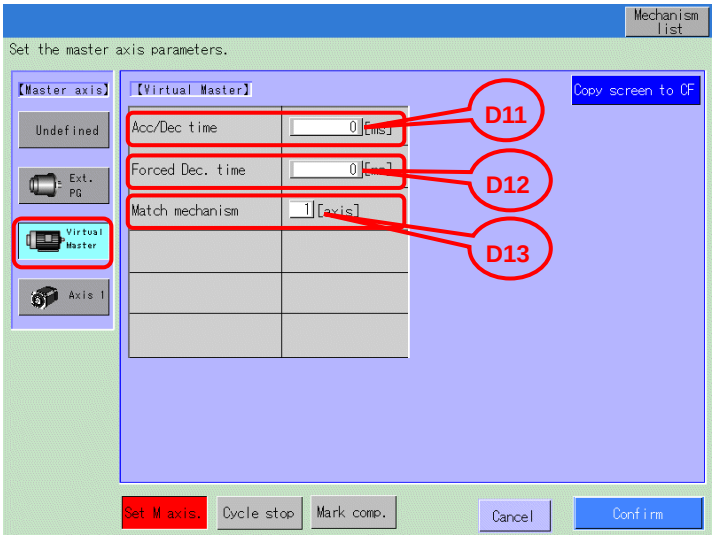
[Screen specification]

Position	Name	Description	
D1	Gear ratio	Set gear ratio. Range : [1 to 999] / [1 to 999]	*1
D2	Pitch	Set travel per tooth. Range : 1 to 999(mm)	*1
D3	Tooth number	Set tooth number. Range : 1 to 999	*1
D4	Unit of travel	Select unit of travel from below. [mm], [PLS]	*2
D5	Decimal point	Select decimal point of travel from below. [1], [0.1], [0.01], [0.001]	*2
D6	Unit of speed	Select unit of speed from below. [unit/s], [r/min]	*2
D7	Lead	Set travel per rotation. Range : 1 to 999 (mm)	*1
D8	Sealer diameter	Set sealer diameter. Range : 1 to 999 (mm)	*1
D9	Blade number	Set blade number. Range : 1 to 999	*1
D10	Roll diameter	Set roll diameter. Range : 1 to 999 (mm)	*1

*1 If you touch screen, data entry screen appears.

*2 If you touch screen, select screen appears.

[Master axis (Virtual master axis) setting screen]

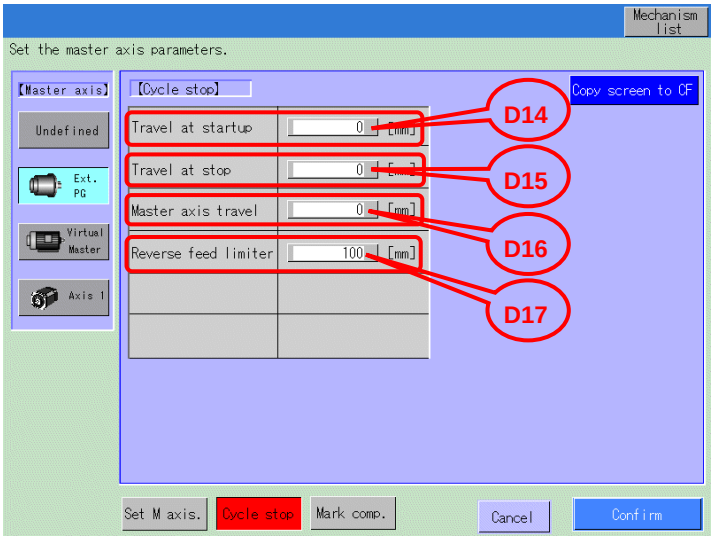


[Screen specification]

Position	Name	Description
D11	Acc/Dec. time	Set Acceleration/Deceleration of Virtualmaster axis. Range : 0 to 65535(ms) *1
D12	Forced Dec. time	Set forced stop deceleration time of Virtual master axis. *1 Range : 0 to 65535(ms)
D13	Match mechanism	Virtual master axis operates as same mechanism data of selected axis. *1 Range : 1 to8(axis) Note）If you select undefined axis, mechanism data is unsettled and virtual master axis operation also become unsettled. Therefore, make sure to select defined axis.

*1 If you touch screen, data entry screen appears.

[Cycle stop setting screen]

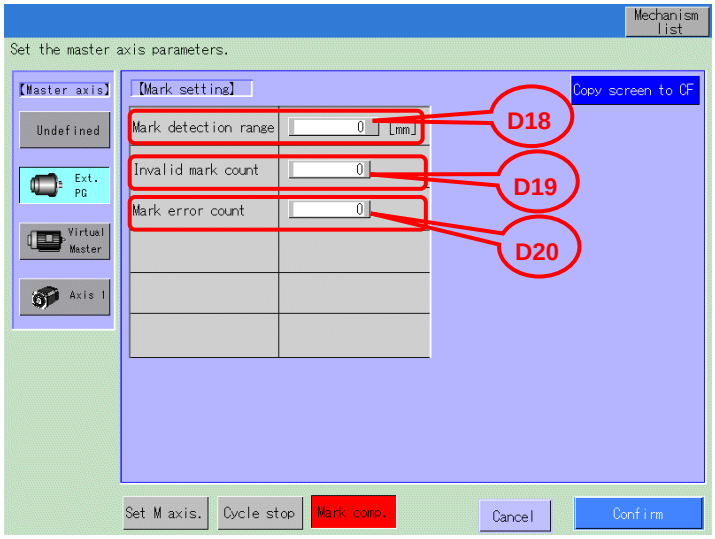


[Screen specification]

Position	Name	Description	
D14	Travel at startup	Set travel at startup. Range : 0 to 2147483647	*1
D15	Travel at stop	Set travel at stop. Range: 0 to 2147483647	*1
D16	Master axis travel	Set Master axis travel per cycle. Range : 0 to 2147483647	*1
D17	Reverse feed limiter	Set limiter value when Master axis reverse rotation. Range : 0 to 2147483647	*1

*1 If you touch screen, data entry screen appears.

[Mark setting screen]



[Screen specification]

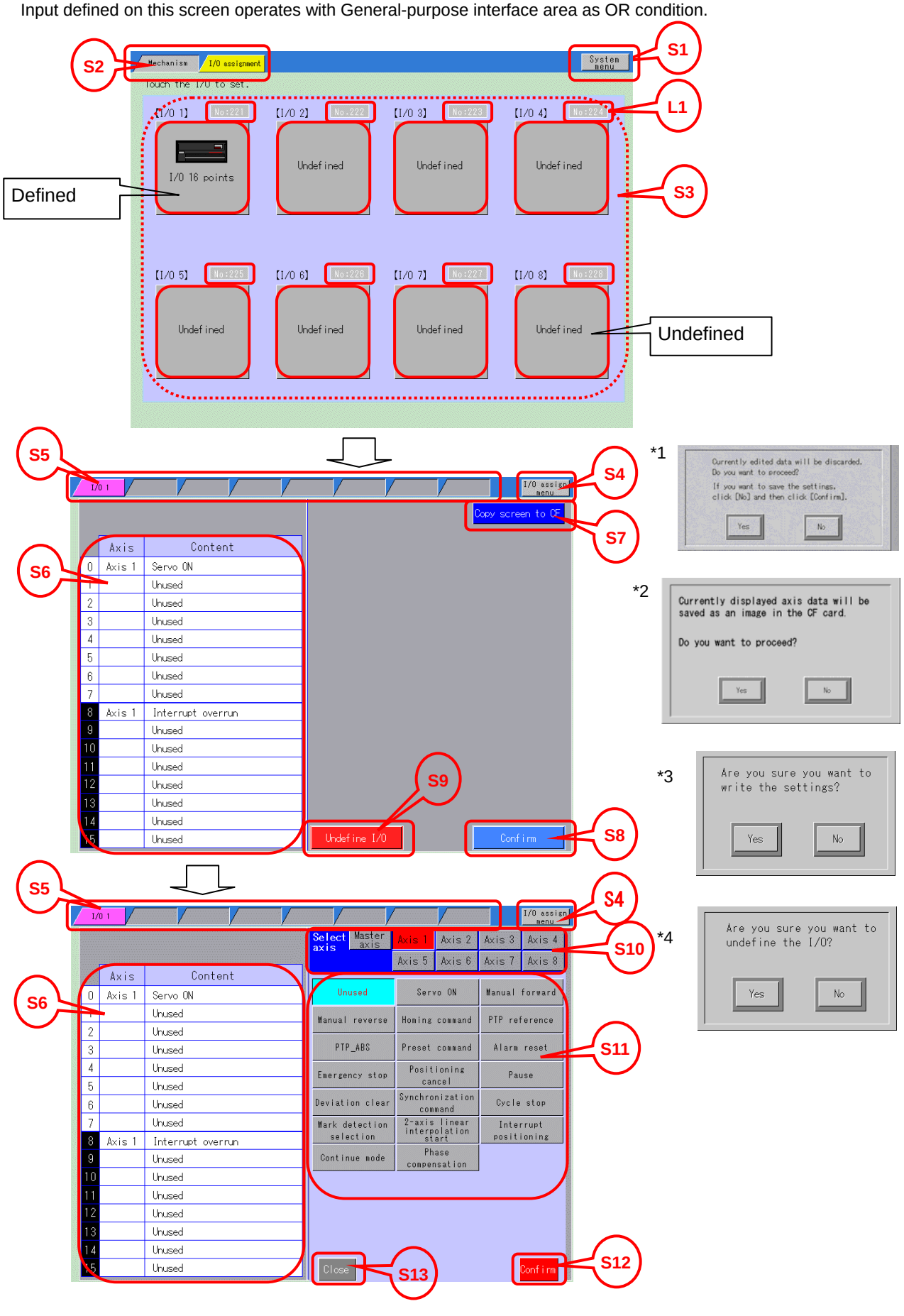
Position	Name	Description
D18	Mark detection range	This parameter is used for timing when FALDIC interrupt position detection is set ON and for mark error detection. Range : 0 to 2147483647 *1
D19	Invalid mark count	The set number of marks are not measured from [Mark length measurement start]. Range : 0 to 99(cycle) *1
D20	Mark error count	The set number of mark errors are detected, a mark error occurs to stop synchronization. Range : 0 to 99(times) *1

*1 If you touch screen, data entry screen appears.

Section 4 Screen Specification

4-2-7 I/O definition screen (No.902, 971)

Define signal to I/O terminal.
Input defined on this screen operates with General-purpose interface area as OR condition.



Section 4 Screen Specification

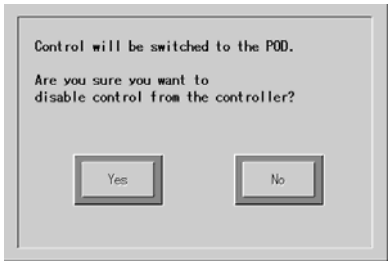
[Screen Specification]

Position	Name	Description
S1	System menu	Move to System menu screen (No.910).
S2	Configurarion definition select	Select configuration definition screen. [Mechanism], [I/O assignment]
S3	I/O terminal select	Select I/O terminal.
L1	Configuration indication	Lamp indicates ON if I/O terminal is connected.
S4	I/O assign menu	Move to I/O definition screen (No.902). If you touch while editing, confirmation screen to discard contents of edit (*1) will appear.
S5	I/O terminal select	Select I/O terminal.
S6	Signal select	Function assigned to signal (bit) of I/O terminal displayed. If you touch signal (bit) of I/O terminal, Select axis screen will appear.
S7	Copy screen to CF	Copy displayed screen into CF card. Confirmation screen displayed (*2), If you push [YES], save to CF card. Saved to \MOTION8\HDCOPY\HD971~**.JPG folder. ** is I/O terminal No. (01 to 08)
S8	Confirm	Parameter change confirmation screen (*3) displayed. If you select [YES], back to I/O definition screen (No.902).
S9	Undefine I/O	Change selected I/O to undefined. Undefined change confirmationscreen (*4) displayed.
S10	Select axis	Select axis to be assigned to selected signal (bit).
S11	Function select	Select function to be assigned to selected signal (bit).
S12	Confirm	Assign selected axis and function to selected signal (bit).
S13	Close	Close Select axis screen.

Section 4 Screen Specification

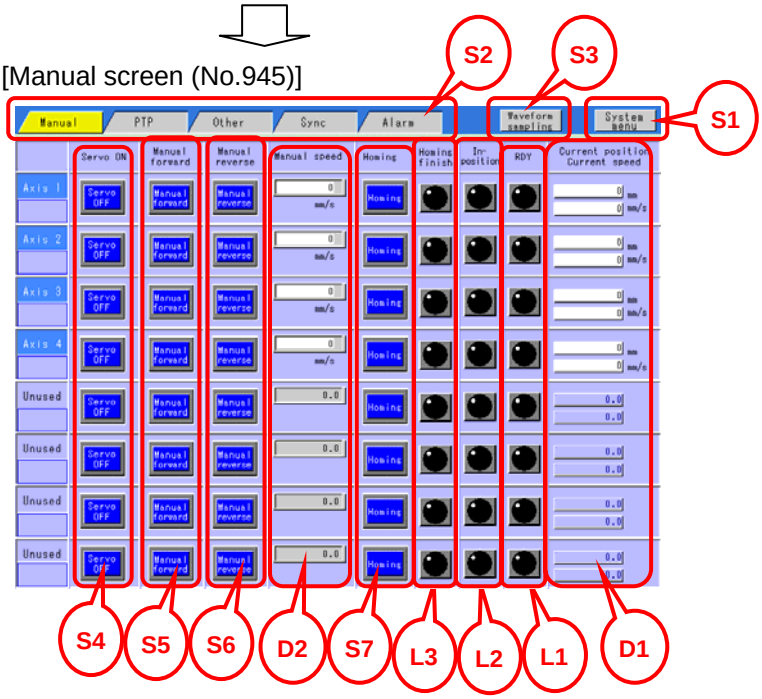
4-3 Test Run Screen (No.945 to 949)

Execute individual operation for each axis. It is used for Test run when start system.



*1 When move from System menu, confirmation screen to switch control to Display unit displayed.

[Manual screen (No.945)]



*2 Switch confirmation screen

[Screen Specification]

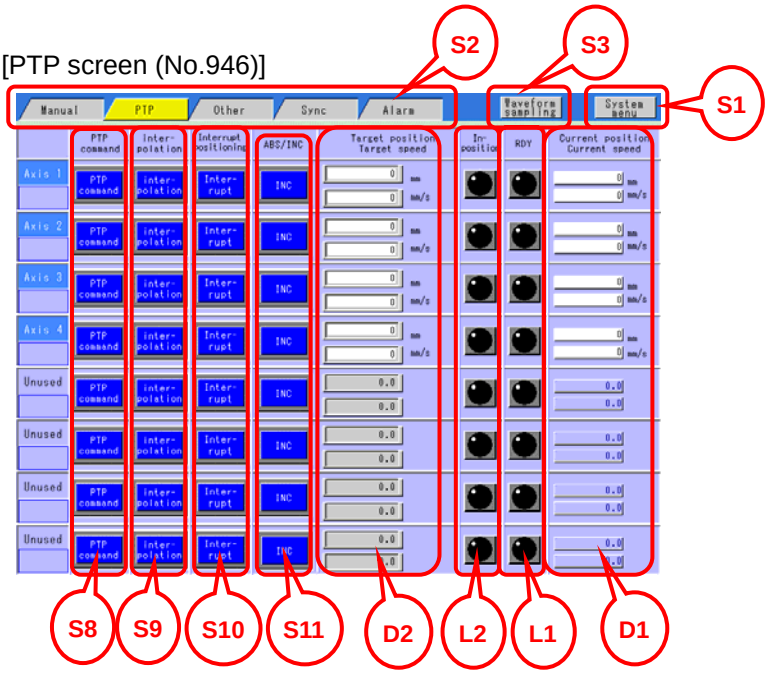
Position	Name	Description
S1	System menu	Move to System menu screen (No.910). If you touch, switch confirmation screen (*2) will shown.
S2	Test run item select	Select Test run item. [Manual], [PTP], [Other], [Sync], [Alarm]
S3	Wave form sampling	Move to wave form sampling screen.
S4	Servo ON	Servo amplifire is servo locked (Alternative SW).
S5	Manual forward	Current position moves to forward.
S6	Manual reverse	Current position moves to reverse.
S7	Homing	Start Homing.
L1	RDY	Lamp goes ON when servo ON and possible to rotate.
L2	In-position	Lamp goes ON when In-position.
L3	Homing finish	Lamp goes ON by FALDIC homing completion signal.
D1	Current position Current speed	Display servo current position. Display servo current speed.
D2	Manual speed	Set manual speed.

* Notes on Test run

When operate with [Manual] or [PTP], make sure [Servo ON] button to ON in [Manual] screen. It is not possible to operate without [Servo ON] state.

Section 4 Screen Specification

[PTP screen (No.946)]



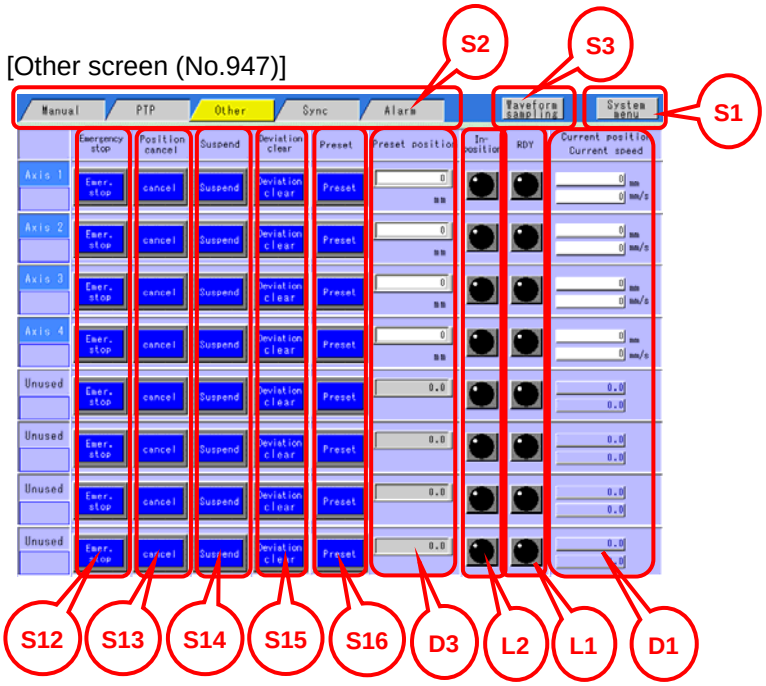
[Screen Specification]

Position	Name	Description
S8	PTP command	Start PTP (Point To Point) run.
S9	Interpolation	Start 2 axis interpolation. Valid for 1,3,5,7 axis.
S10	Interrupt	Start interrupt positioning.
S11	ABS/INC	Switch ABS(Absolute position) and INC(Relative position). (Alternative SW)
D2	Target position target speed	Input target position * Input target speed.

* If you touch screen, data entry screen appears.

Section 4 Screen Specification

[Other screen (No.947)]



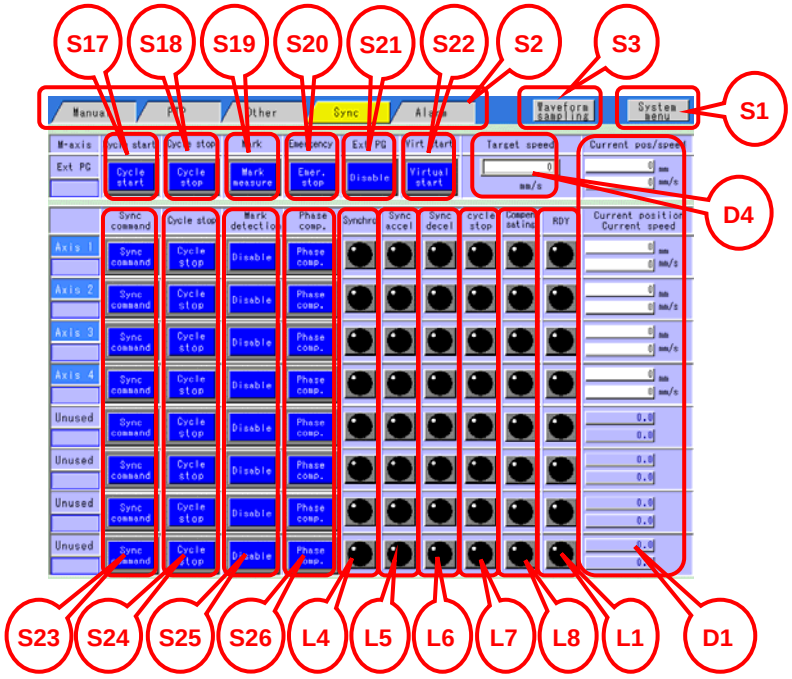
[Screen Specification]

Position	Name	Description
S12	Emergency stop	At the rising edge of this signal, positioning is stopped. The speed instantly becomes 0.
S13	Positioning cancel	At the rising edge of this signal, positioning is stopped. Controlled stop is caused.
S14	Suspend	At the rising edge of this signal, positioning is stopped. When this signal is set OFF, positioning is resumed.
S15	Deviation clear	While this signal is ON, the difference (deviation) between the command and homing positions is assumed to be 0.
S16	Preset	At the rising edge of this signal, the current position is changed to [Preset data].
D3	Preset position	Input preset position data. *

* If you touch screen, data entry screen appears.

Section 4 Screen Specification

[Syncronous screen (No.948)]



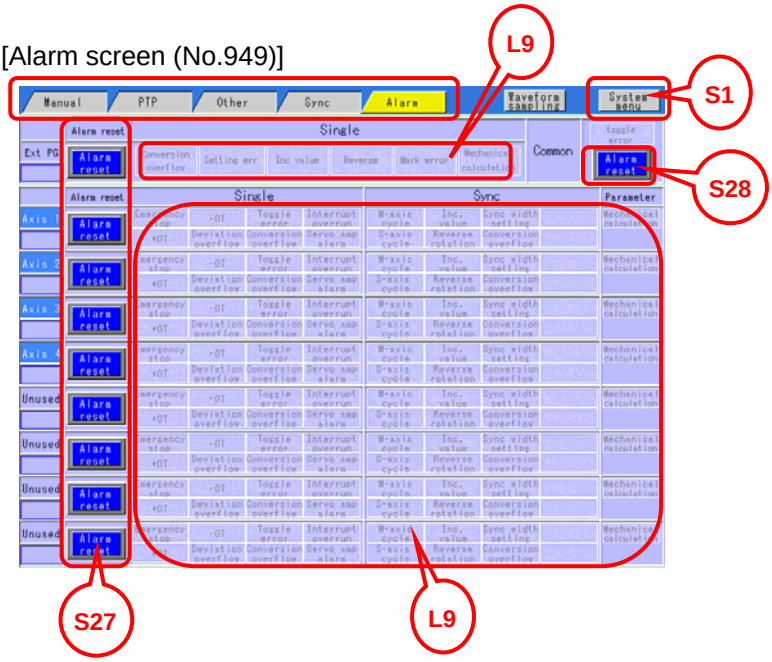
[Screen Specification]

Position	Name	Description
S17	Cycle start	Master axis cycle start (Alternative SW).
S18	Cycle stop	Master axis cycle stop (Alternative SW).
S19	Mark detection	Start mark measurement. (Alternative SW).
S20	Emergency stop	Virtual master axis emergency stop.
S21	External PG	When disabled, stop to read external PG. (Alternative SW).
S22	Virtual start	Run virtual master axis. (Alternative SW).
S23	Syncronous command	Start synchronization (Alternative SW).
S24	Cycle stop	Cycle stop. If you press, operation resumed. (Alternative SW).
S25	Mark detection selection	Select mark detection Enable/Disable. (Alternative SW).
S26	Phase compensation	Start phase compensation.
L4	Synchronizing	ON while in synchronization.
L5	Sync accelerating	ON while sync accelerating.
L6	Sync decelerating	ON while sync decelerating.
L7	Cycle stop	ON while cycle stop.
L8	Compensating phase	ON while compensating phase.
D4	Target speed	Set target speed of virtual master axis. *

* If you touch screen, data entry screen appears.

Section 4 Screen Specification

[Alarm screen (No.949)]



[Screen Specification]

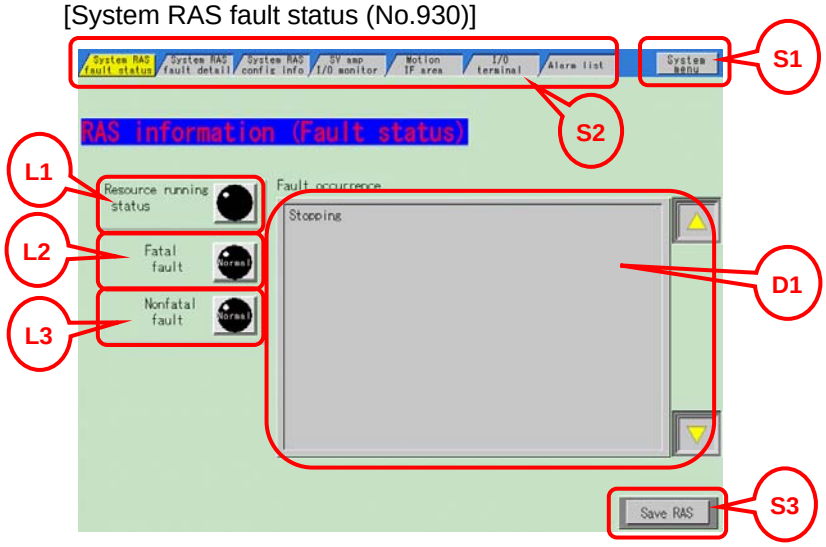
Position	Name	Description
S27	Alarm reset	Reset servo alarm.
S28	Alarm reset	Reset alarm of motion toggle error.
L9	Alarm display	Lamp goes ON of occurred alarm. If you press alarm with Lamp ON, detailed information displayed.

Section 4 Screen Specification

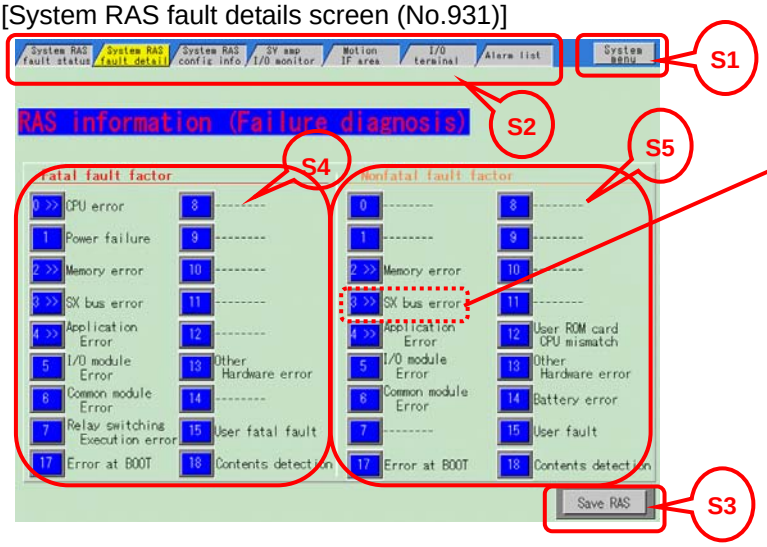
4-4 Failure Diagnosis Screen (No.930 to 932, 935 to 938)

Monitor controller unit and servo status.

[System RAS fault status (No.930)]



[System RAS fault details screen (No.931)]



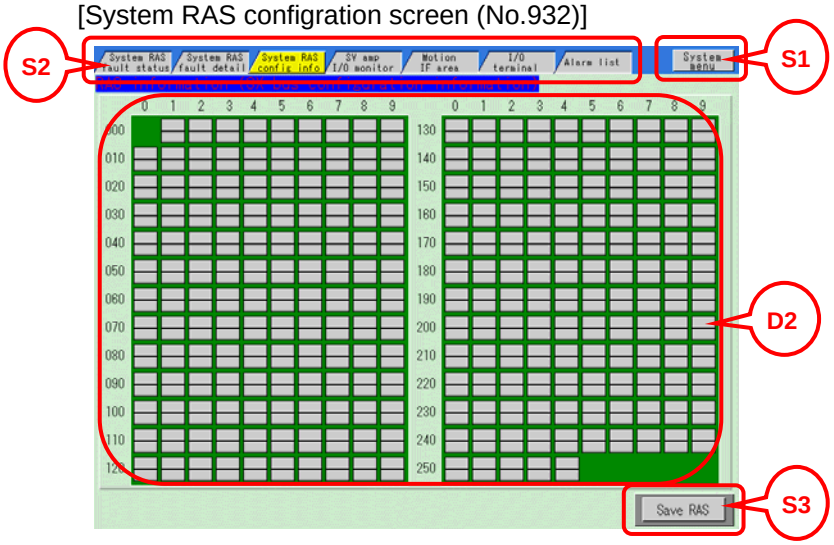
* Detailed factor

[Screen Specification]

Position	Name	Description
S1	System menu	Move to System menu screen (No.910).
S2	Select diagnosis item	Select diagnosis item. [System RAS fault status], [System RAS fault details], [System RAS config info], [SV amp I/O monitor], [Motion IF area], [I/O terminal], [Alarm list]
S3	Save RAS	Save controller unit system memory. If you touch, CF write screen displayed. Y/M/D/H/M/S is saved at top of file, then 512 words memory aresaved. File name should be within 8 characters. File is saved under \MOTION8\RECIPE\RAS folder in CF card.
L1	Resource running status	Lamp goes ON when controller unit is in Run status.
L2	Fatal fault status	Lamp goes ON when controller unit is in Fatal fault status.
L3	Nonfatal fault status	Lamp goes ON when controller unit is in Nonfatal fault status.
D1	Fault occurrence	Display controller unit status.

Position	Name	Description
S4	Fatal fault factor	Lamp goes ON for Fatal fault factor. If you press [>>] SW, detailed factor displayed.
S5	Nonfatal fault factor	Lamp goes ON for Nonfatal fault factor. If you press [>>] SW, detailed factor displayed.

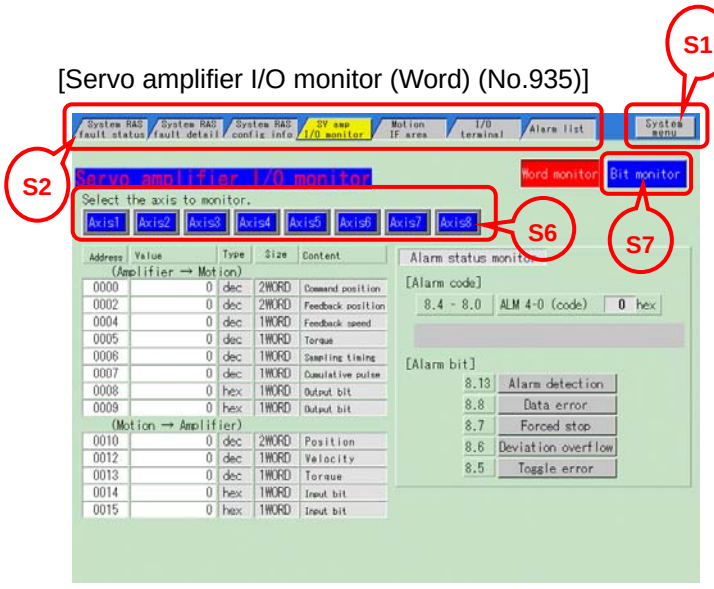
[System RAS configration screen (No.932)]



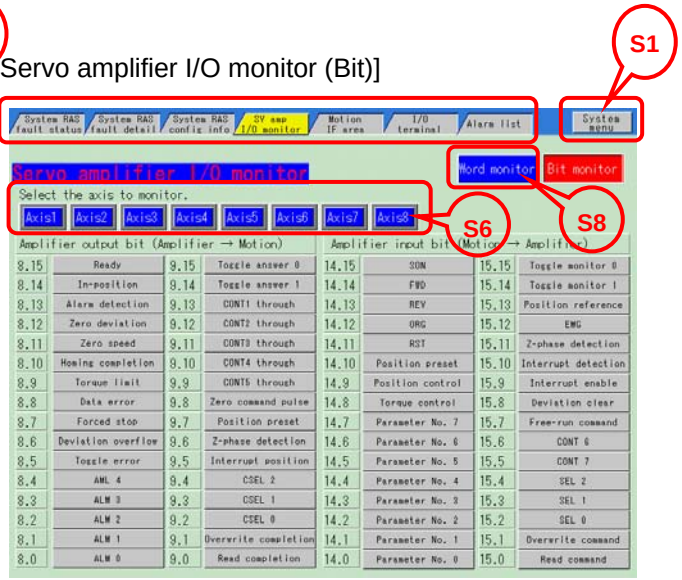
[Screen specification]

Position	Name	Description
D2	SX bus configuration information	SX bus configuration information displayed. (Upper section : SX bus Configuration, Lower section : SX bus fault) Axis 1 : 201 to Axis 8 : 208 I/O terminal 1 : 221 to I/Oterminal 8 : 228

[Servo amplifier I/O monitor (Word) (No.935)]



[Servo amplifier I/O monitor (Bit)]



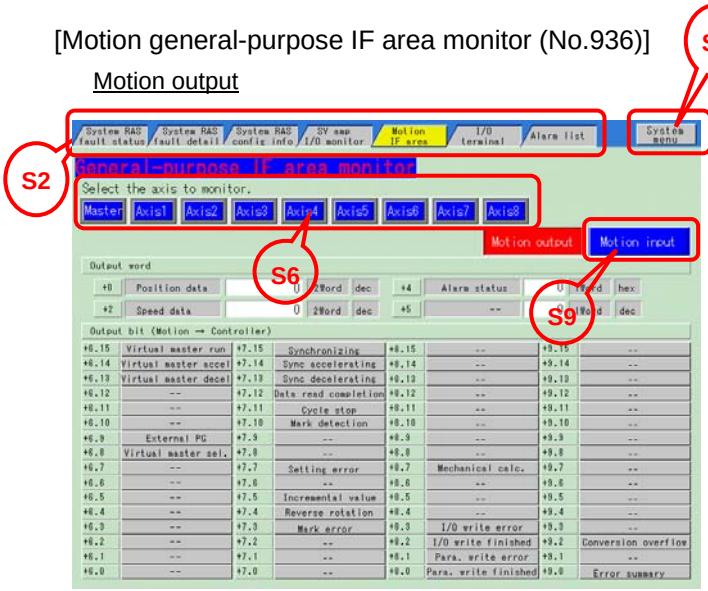
[Screen specification]

Position	Name	Description
S6	Select axis	Select servo amplifier axis to be monitored. Unused axis cannot be selected.
S7	Bit monitor	Switch to Bit monitor.
S8	Word monitor	Switch to Word monitor.

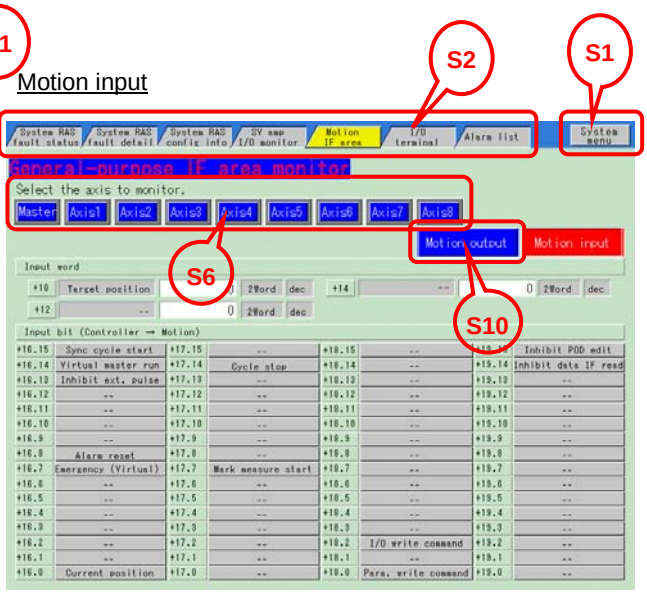
Section 4 Screen Specification

[Motion general-purpose IF area monitor (No.936)]

Motion output



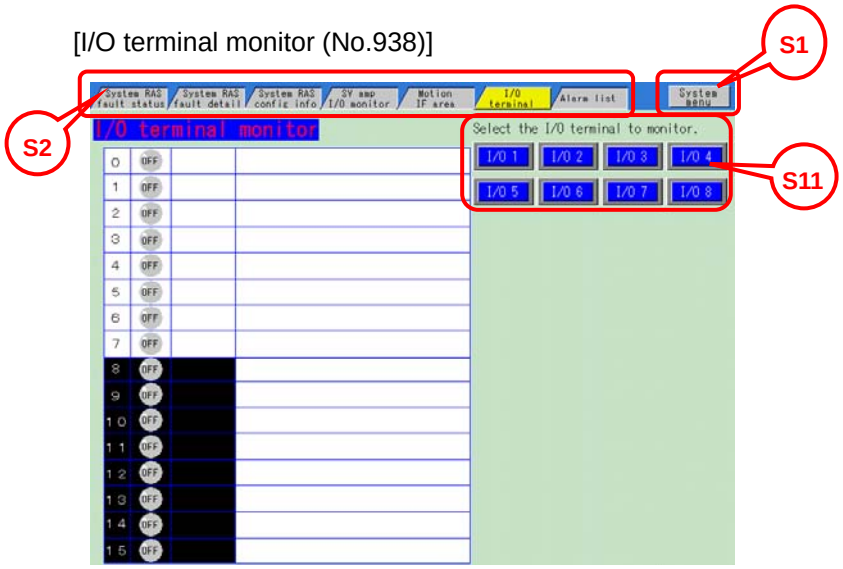
Motion input



[Screen specification]

Position	Name	Description
S6	Select axis	Select axis to be monitored. Unused axis cannot be selected.
S9	Motion input	Switch to Motion input screen.
S10	Motion output	Switch to Motion output screen.

[I/O terminal monitor (No.938)]

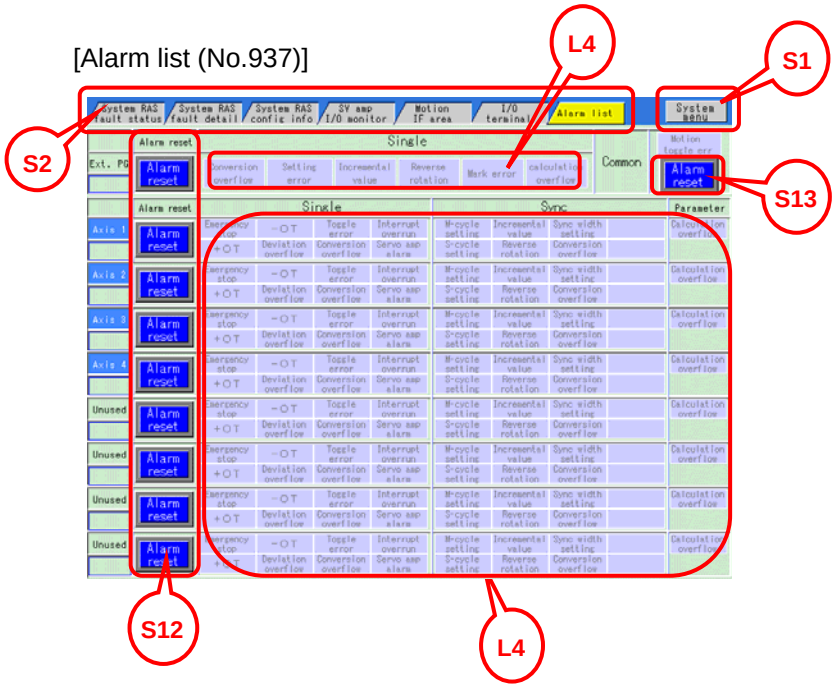


[Screen Specification]

Position	Name	Description
S11	Select I/O terminal	Select I/O terminal to be monitored. Unused axis cannot be selected.

Section 4 Screen Specification

[Alarm list (No.937)]



[Screen specification]

Position	Name	Description
S12	Alarm reset	Reset servo alarm.
S13	Alarm reset	Reset alarm of motion toggle error.
L4	Alarm display	Lamp goes ON of occurred alarm. If you press alarm with Lamp ON, detailed information displayed.

Section 4 Screen Specification

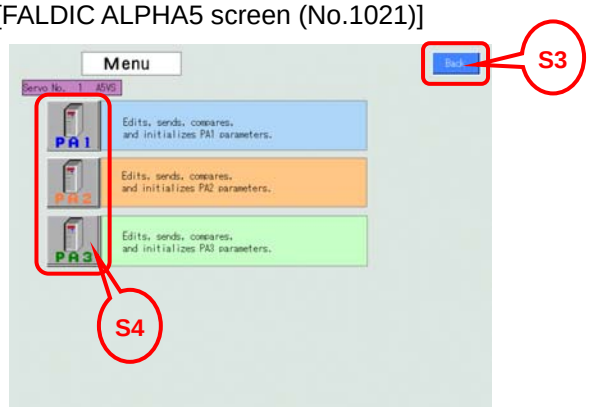
4-5 Servo Loader Screen (No.1000 to 1021)

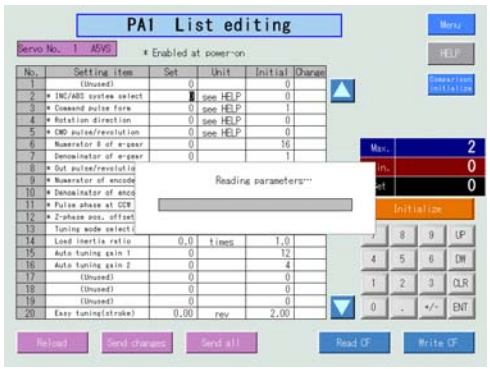
Read → Edit → Write FALDIC parameter. (FALDIC-α/ALPHA5)

[Servo No. selection (No.1020)]

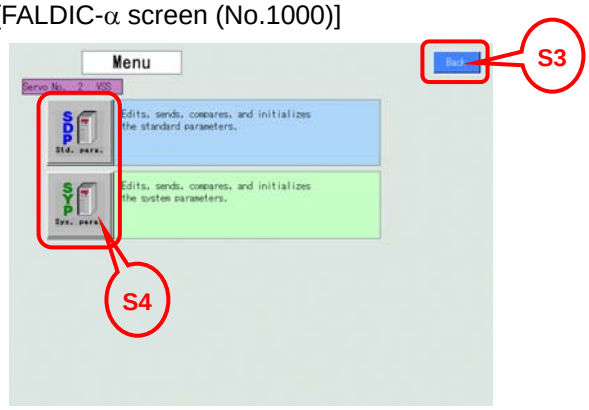
[Menu]

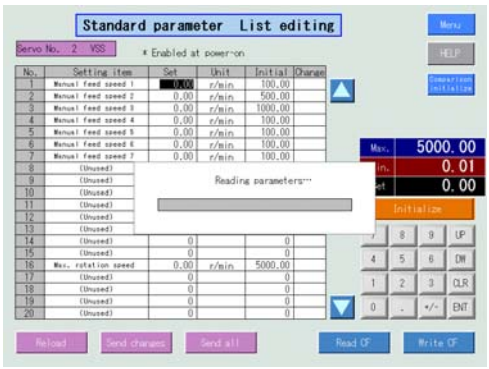
[FALDIC ALPHA5 screen (No.1021)]





[FALDIC-α screen (No.1000)]



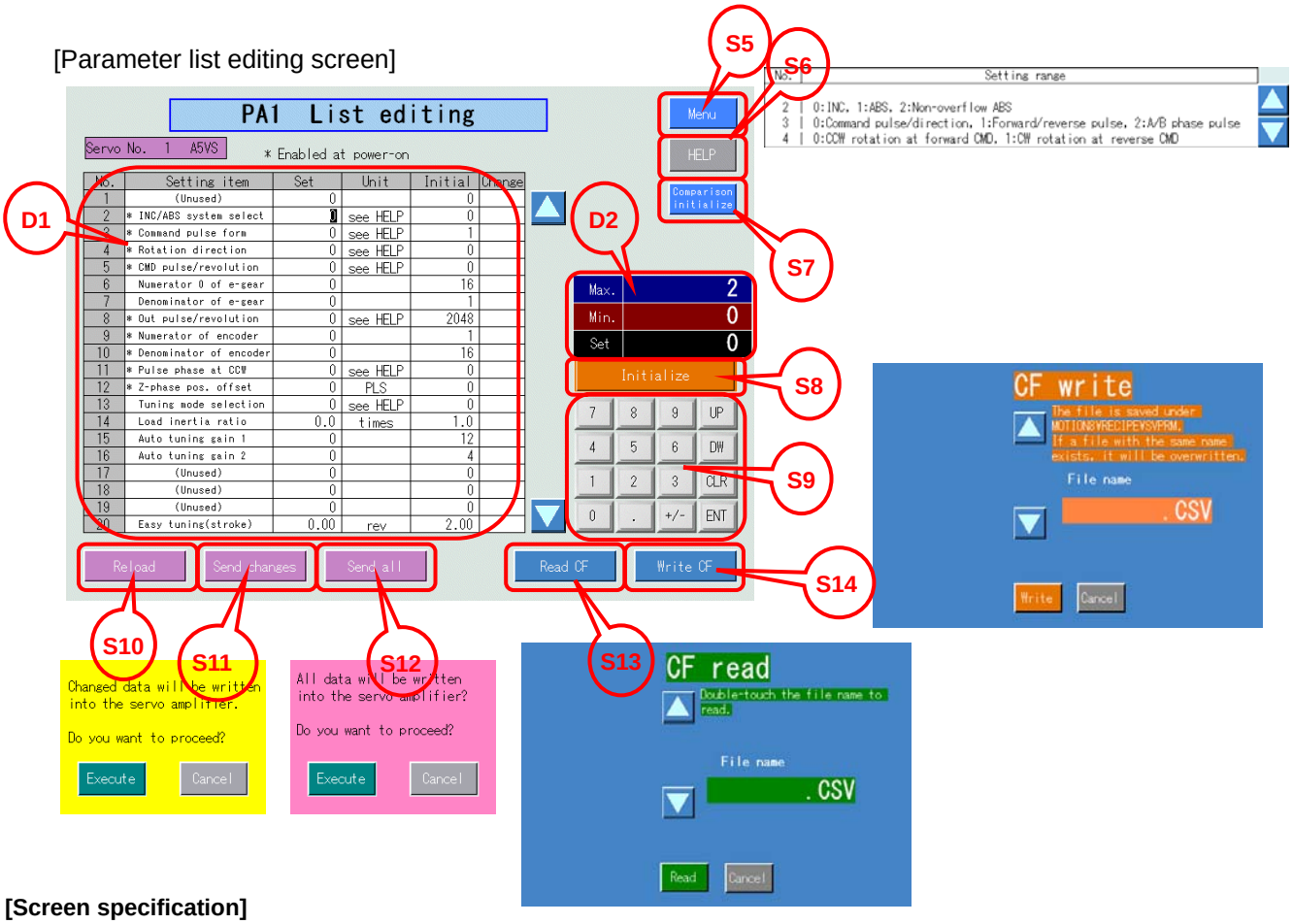


[Screen specification]

Position	Name	Description
S1	System menu	Move to System menu (No.910).
S2	Select axis	Select servo amplifier parameter to be edit. Move to menu (No.1000,1021).
S3	Back	Back to servo No. select screen (No.1020).
S4	Select parameter group	Select parameter group to be edit. Read parameter from servo amplifier, and move to List editing.

Section 4 Screen Specification

[Parameter list editing screen]

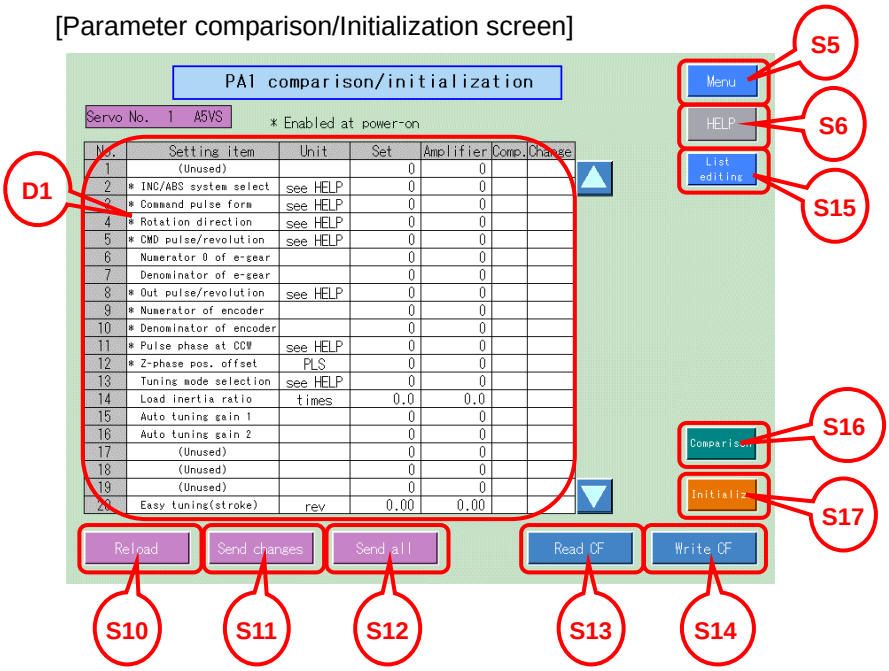


[Screen specification]

Position	Name	Description
S5	Menu	Move to menu screen (No.1000,1021).
S6	HELP	HELP screen displayed for each parameter. Close screen by touch again.
S7	Comparison/Initialize	Move to Comparison/Initialize screen.
D1	Parameter table display	Display servo amplifier parameter table. Change colum show blue color if you change parameter.
D2	Max. Min. Set	Show Max./Min./Setting value of cursor positioned parameter. Entered value by setting value enter key is shown at Set area. By pressing [ENT], this data is transferred to parameter table.
S8	Initialize	Initialize cursor positioned parameter.
S9	Setting value enter key	Used to enter parameter value.
S10	Reload	Read parameter from servo amplifier.
S11	Send changes	Send modified parameter to servo amplifier. Write confirmation screen will displayed.
S12	Send all	Send all parameter to servo amplifier. Write confirmation screen will displayed.
S13	Read CF	Read servo amplifier parameter from CF card. If you touch, Read CF screen will displayed. Double click file name to be read.
S14	Write CF	Write servo amplifier parameter to CF card. If you touch, Write CF screen will displayed. File name should be within 8 characters. File is saved under \MOTION8\RECIPE\SVPRM folder in CF card.

Section 4 Screen Specification

[Parameter comparison/Initialization screen]


PA1 comparison/initialization
Servo No. 1 A5VS
* Enabled at power-on
No. Setting item Unit Set Amplifier Comp. Change
1 (Unused) 0 0
2 * INC/ABS system select see HELP 0 0
3 * Command pulse form see HELP 0 0
4 * Rotation direction see HELP 0 0
5 * CMD pulse/revolution see HELP 0 0
6 Numerator 0 of e-gear 0 0
7 Denominator of e-gear 0 0
8 * Out pulse/revolution see HELP 0 0
9 * Numerator of encoder 0 0
10 * Denominator of encoder 0 0
11 * Pulse phase at CCW see HELP 0 0
12 * Z-phase pos. offset PLS 0 0
13 Tuning mode selection see HELP 0 0
14 Load inertia ratio times 0.0 0.0
15 Auto tuning gain 1 0 0
16 Auto tuning gain 2 0 0
17 (Unused) 0 0
18 (Unused) 0 0
19 (Unused) 0 0
20 Easy tuning(stroke) rev 0.00 0.00
Menu
HELP
List editing
Comparison
Initializ
Reload
Send changes
Send all
Read CF
Write CF
D1
S5
S6
S15
S16
S17
S10
S11
S12
S13
S14

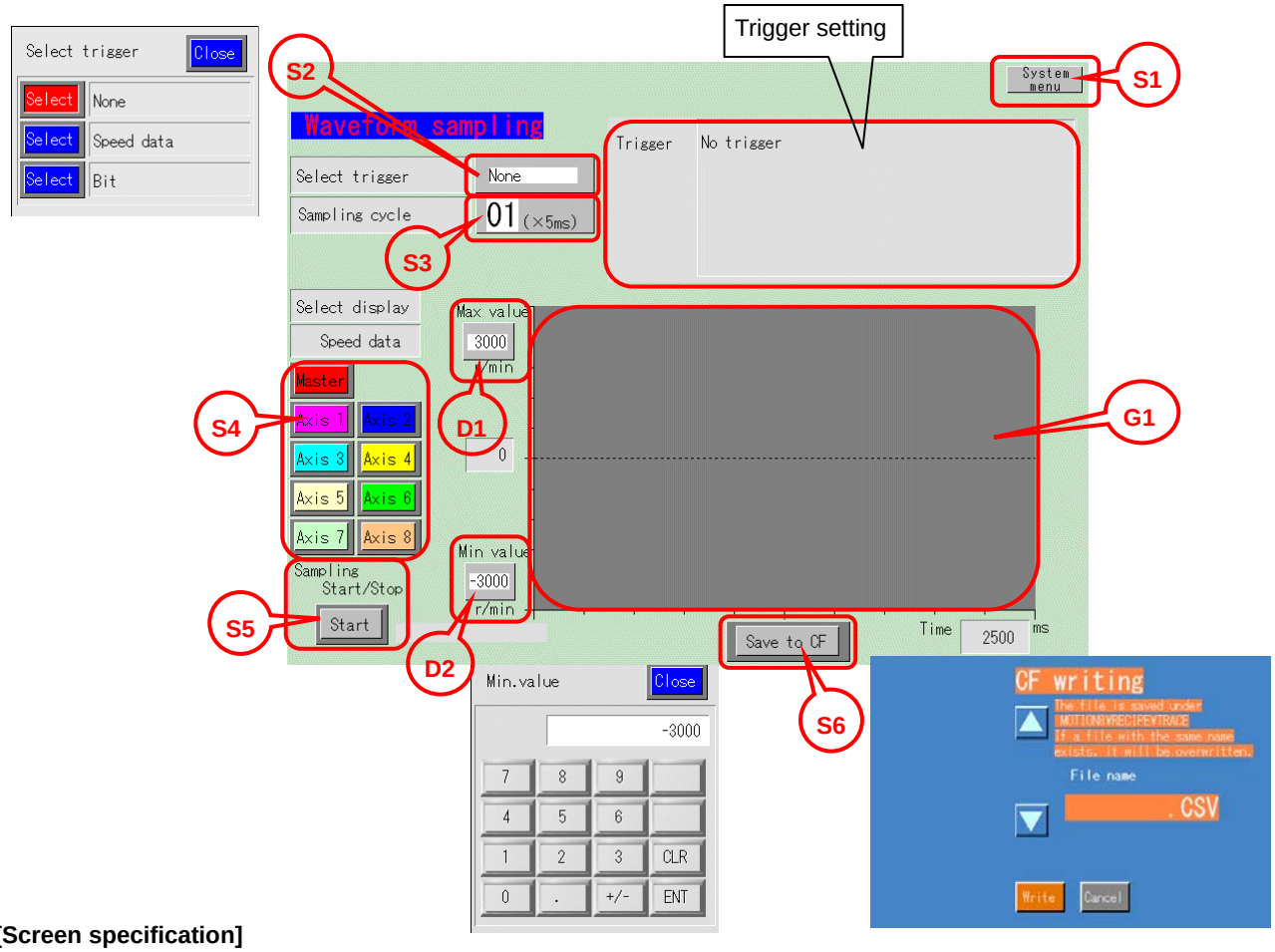
[Screen specification]

Position	Name	Description
S15	List editing	Move to Parameter list editing screen.
S16	Comparison	Compare current editing parameter and parameter in servo amplifier. Result of comparison is displayed as red color for unmached parameter.
S17	Initialize	Initialize current editing parameter.
D1	Parameter table display	Display servo amplifier parameter table. Change colum show blue color if you change parameter.

Section 4 Screen Specification

4-6 Wave Form Sampling Screen (No.925)

Wave form sampling display maximum 8 axis speed data simultaneously.
Minimum sampling cycle is 5ms.
Maximum sampling point is 500. When 5ms sampling, total 2.5 s data is stored.



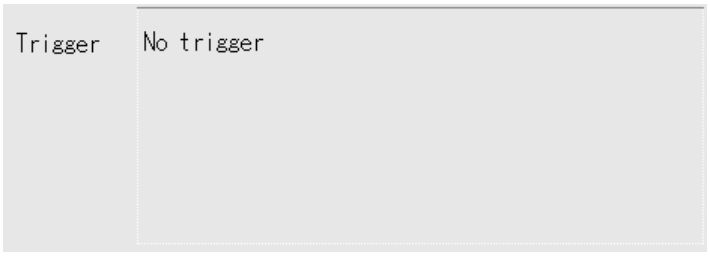
[Screen specification]

Position	Name	Description
S1	System menu	Move to System menu screen (No.910).
S2	Select trigger	Select trigger to start sampling from below. [None], [Speed data], [Bit]
S3	Sampling cycle	Set sampling cycle to an integral multiple of takt (5ms). * Range : 1 to 99
S4	Select axis	Select axis of speed wave. Sampling is executed even if axis is not selected. Therefore, select axis and graph display is possible after finish sampling.
S5	Sampling start	Start sampling according to trigger condition. After finish sampling, display [Reading] and read data from PLC.
S6	Save to CF	Save sampling wave data. If you touch, Write CF screen will displayed. File name should be within 8 characters. File is saved under \MOTION8\RECIPE\TRACE folder in CF card.
D1	Max. value	Set maximum value of graph. Range : -9999 to 9999(r/min) *
D2	Min. value	Set minimum value of graph. Range : -9999 to 9999(r/min) *
G1	Speed wave display	Display maximum 8 axis speed wave. Graph color is same as axis select SW.

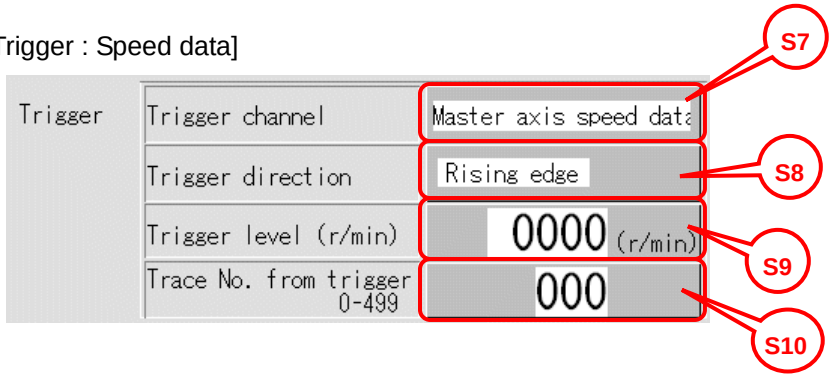
* If you touch screen, data entry screen appears.

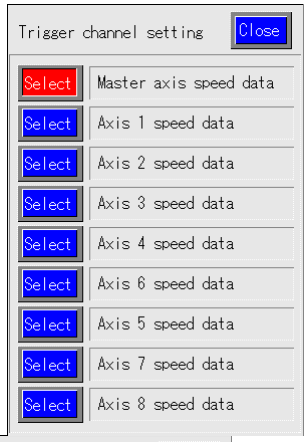
<Select trigger>
Display content different depends on trigger type.

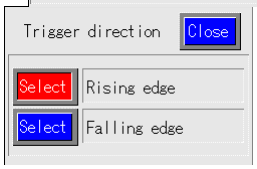
[Trigger : None]

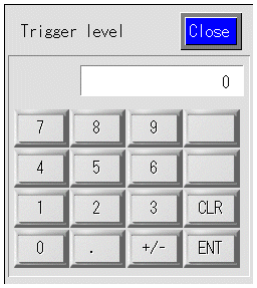


[Trigger : Speed data]

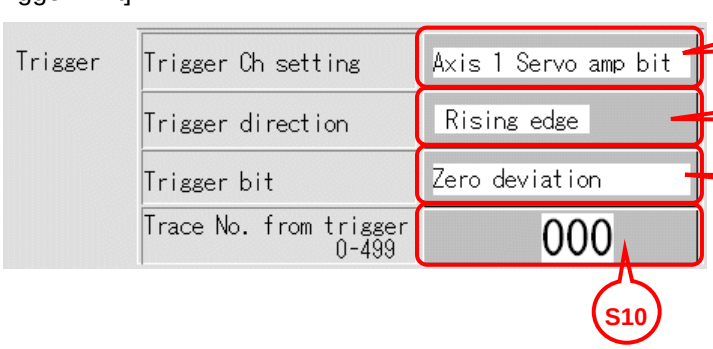


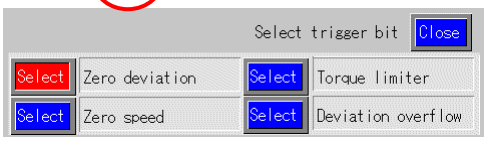






[Trigger : Bit]





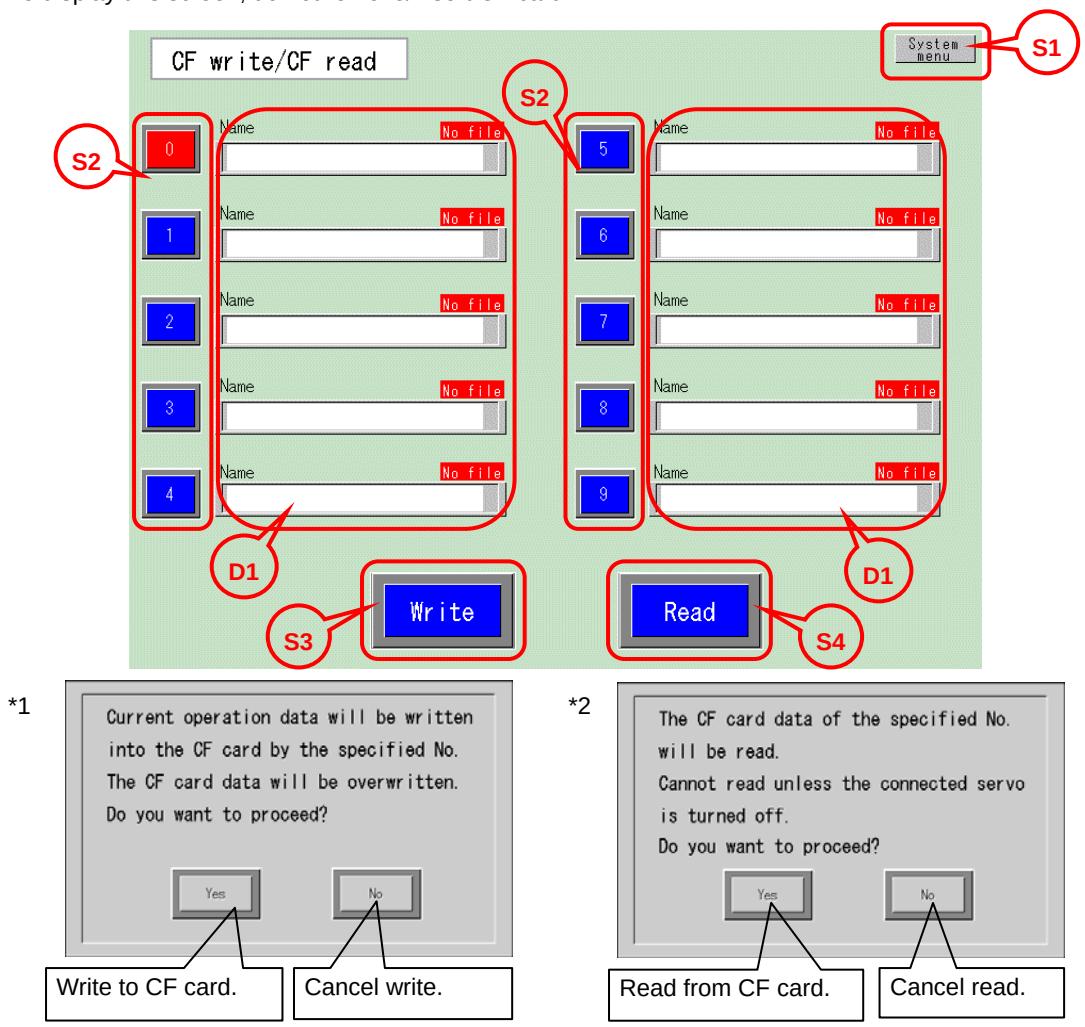
[Screen specification]

Position	Name	Description
S7	Trigger channel	Select trigger Ch (Master axis, Axis1 to 8)
S8	Trigger direction	Select trigger direction ([Rising edge]/[Falling edge]).
S9	Trigger level	Set trigger speed. (r/min)
S10	Trace No. from trigger	Set number of trace from trigger. Range : 0 to 499 If you set 100, execute 400 point sampling before trigger and 100 point sampling after trigger.
S11	Trigger bit	Select trigger bit from following FALDIC signal. [Zero deviation], [Zero speed], [Torque limiter], [Deviation overflow]

Section 4 Screen Specification

4-7 CF Card Screen (No.955)

Read/Write operation data to CF card inserted to display unit.
Maximum 10 data can be stored to CF card.
While display this screen, do not remove/insert CF card.



[Screen specification]

Position	Name	Description
S1	System menu	Move to System menu screen (No.910).
S2	Select No.	Select number to access to CF card. File name is decided according to number.
S3	Write	Write [Parameter area][Data interface area] in controller to CF card after display confirmation screen (*1). Invalid when CF card is not inserted.
S4	Read	Write [Parameter area][Data interface area] in CF card to controller after display confirmation screen (*2). Invalid when CF card is not inserted or servo operation.
D1	Name	Set name in accordance to number. Name should be within 20 characters. If you touch screen, name entry screen will display.

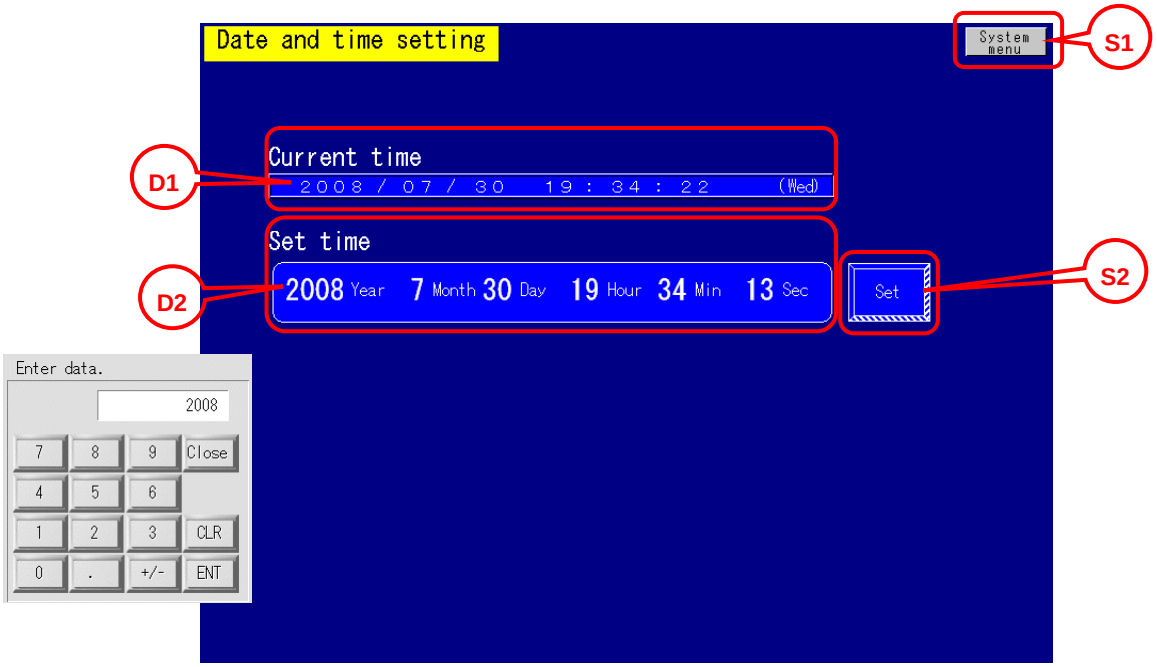
[File name]

File is stored in [\MOTION8\RECIPE] folder.
File name is as shown below.

Number	Parameter area	Data interface area	Future expand area	File name area
1	REC9000.CSV	REC9001.CSV	REC9002.CSV	REC9009.CSV
2	REC9010.CSV	REC9011.CSV	REC9012.CSV	REC9019.CSV
3	REC9020.CSV	REC9021.CSV	REC9022.CSV	REC9029.CSV
4	REC9030.CSV	REC9031.CSV	REC9032.CSV	REC9039.CSV
5	REC9040.CSV	REC9041.CSV	REC9042.CSV	REC9049.CSV
6	REC9050.CSV	REC9051.CSV	REC9052.CSV	REC9059.CSV
7	REC9060.CSV	REC9061.CSV	REC9062.CSV	REC9069.CSV
8	REC9070.CSV	REC9071.CSV	REC9072.CSV	REC9079.CSV
9	REC9080.CSV	REC9081.CSV	REC9082.CSV	REC9089.CSV
10	REC9090.CSV	REC9091.CSV	REC9092.CSV	REC9099.CSV

4-8 Date and time setting screen (No.915)

Set Date and time of controller unit.



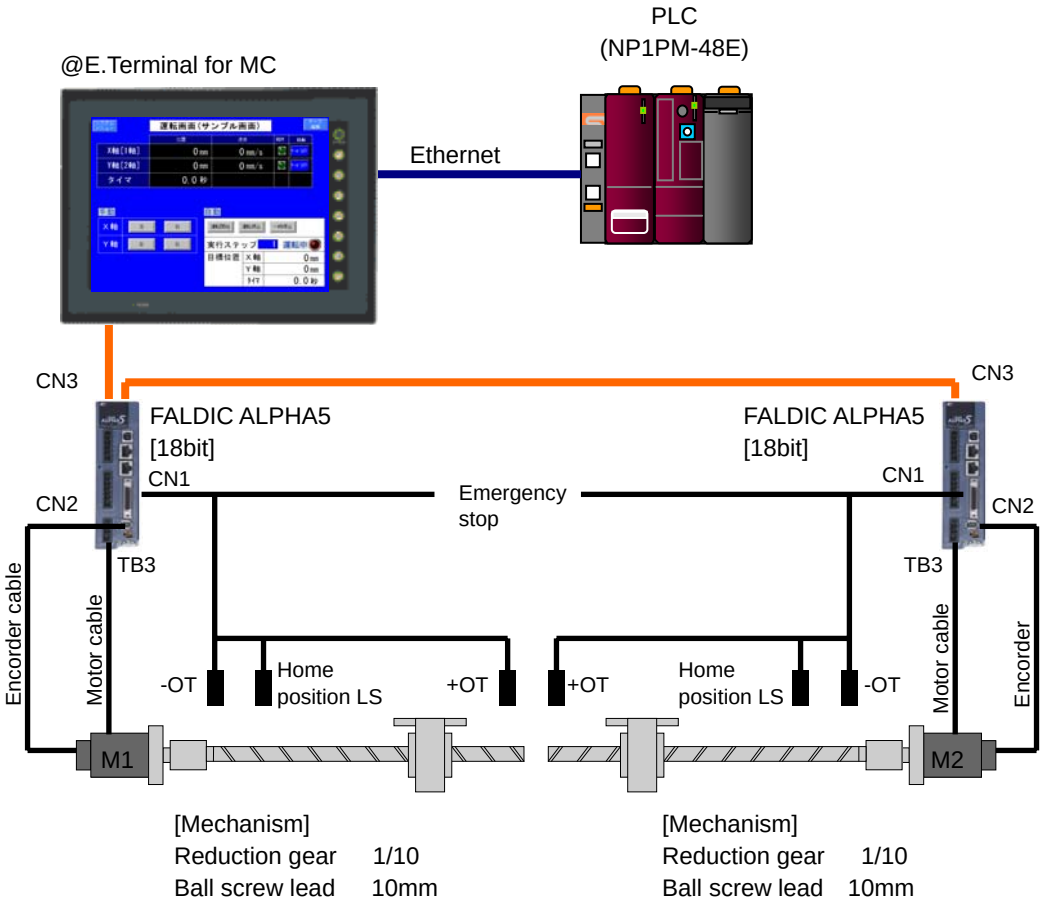
[Screen specification]

Position	Name	Description
S1	System menu	Move to System menu screen (No.910).
D1	Current time	Display current time.
D2	Set time	Enter time to set. If you touch Year/Month/Day/Hour/Min/Sec, data entry screen displayed. Range : 2006-01-01 00:00:00 to 2069-12-31:23:59:59.
S2	Set	Set time to controller unit.

Section 5 System Install Procedure

5-1 System Configuration Example

Here explains @E.Terminal installation procedure with below system (Two axis ball screw mechanism).

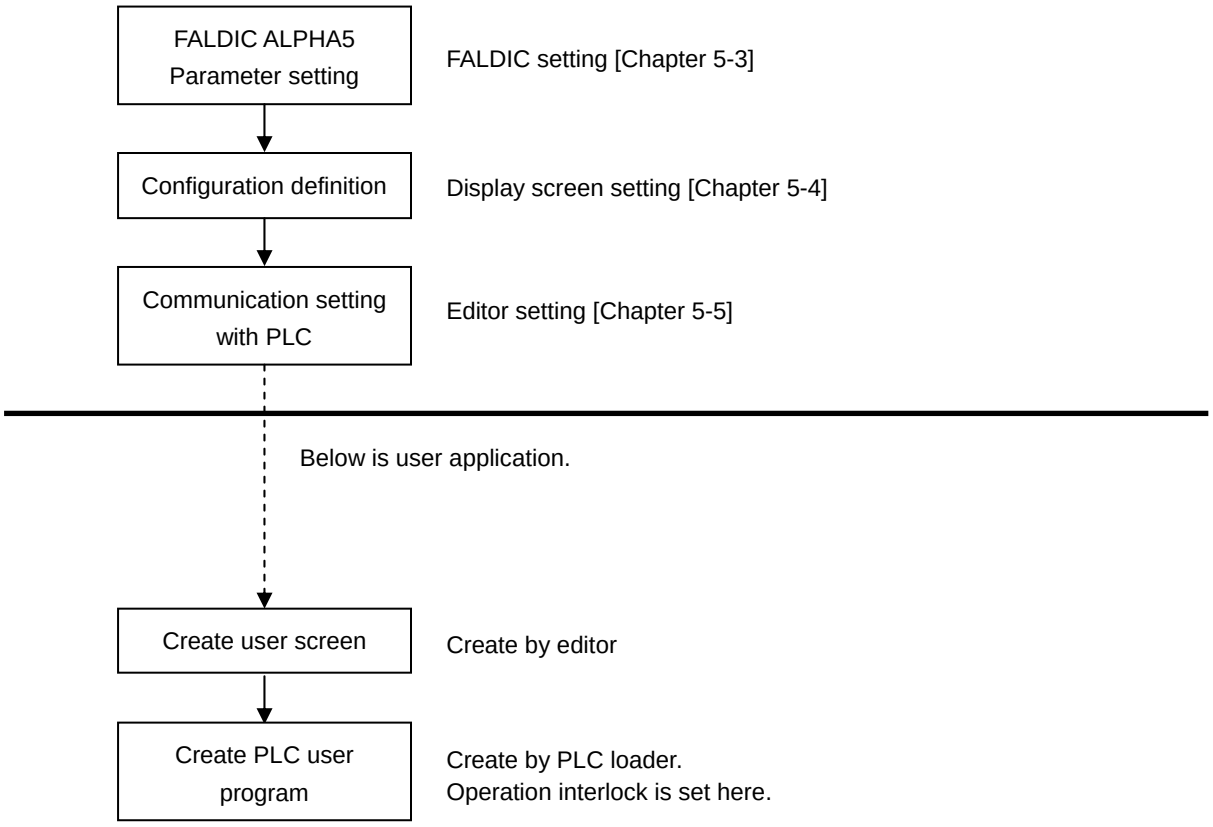


For detail of wiring, please see [FALDIC ALPHA5 User's manual (MEHT301)] - [Chapter2 Wiring].

Section 5 System Install Procedure

5-2 System Setting Procedure

[Flow overview]



5-3 FALDIC ALPHA5 Parameter Setting

Set below parameter to all axis of servo amplifier.

1)PA1-06: Numerator of electronic gear	16→1
2)PA2-72:Station number	00→Servo SX bus station No.(201-208)
3)PA3-02:CONT2 Signal assignment	00→10(Forced stop)
4)PA3-03:CONT3 Signal assignment	00→7(+OT)
5)PA3-04:CONT4 Signal assignment	00→8(-OT)
6)PA3-05:CONT5 Signal assignment	00→6(Home position LS)

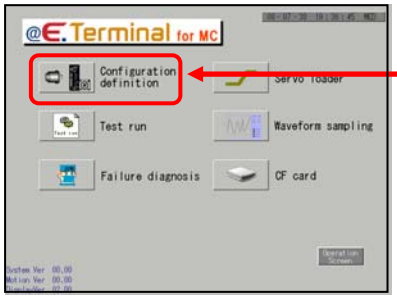
In this example, set M1 station [201], M2 station [202].

For detail of parameter setting, please see [FALDIC ALPHA5 User's manual (MEHT301)] - [Chapter6 Keypad] or [Chapter13 PC Loader].

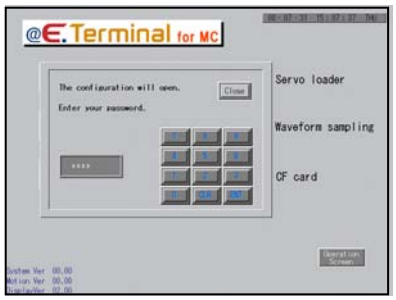
Section 5 System Install Procedure

5-4 Configuration Definition

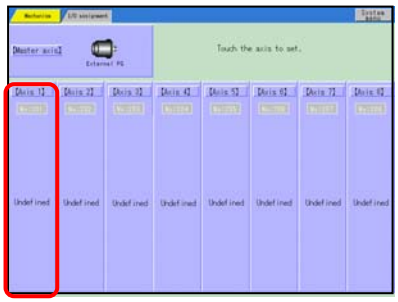
Set as shown below from @E.Terminal for MC menu screen.



Press Configuration definition

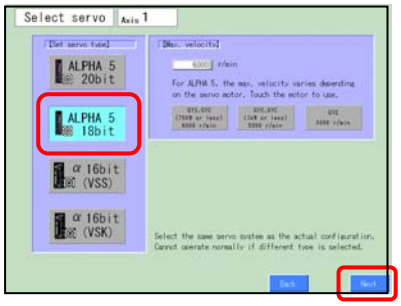


Enter password.
Default value is [0000].



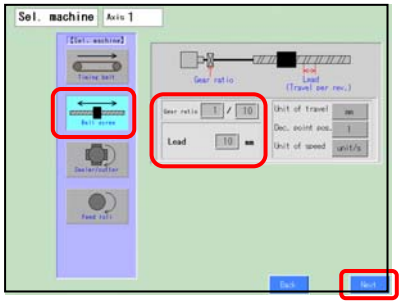
Define for axis1 and axis2.

Press axis1.



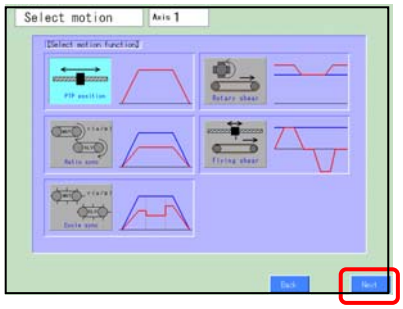
Select [ALPHA5 18bit].

Then press [Next].



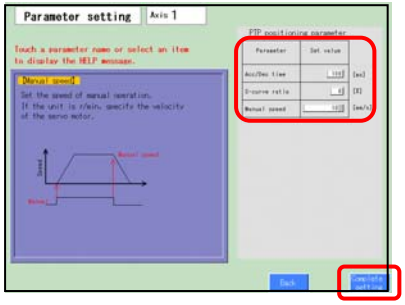
Select [Ball screw].
Set [Gear ratio] 1/10.
Set [Lead] 10mm.

Then press [Next].



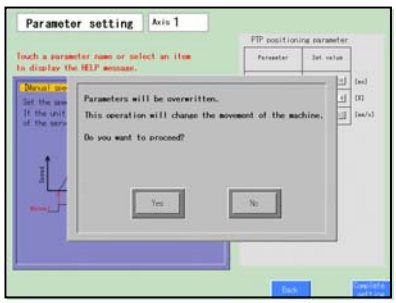
Select [PTP position].

Then press [Next].



Set [Acc/Dec time] 100ms.
Set [Manual speed] 10mm/s.

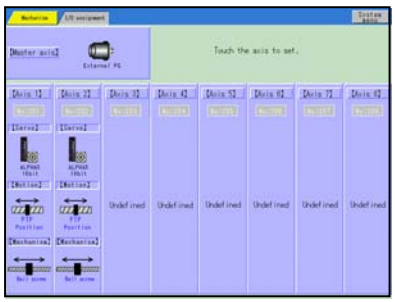
Then press [Complete setting].


Parameter setting
Axis 1
Parameters will be overwritten.
This operation will change the movement of the machine.
Do you want to proceed?

Parameter write confirmation screen displayed. If you press [Yes], setting complete.

Then move to configuration definition screen.

Set axis2 in same manner.
After setting, below screen displayed.



Section 5 System Install Procedure

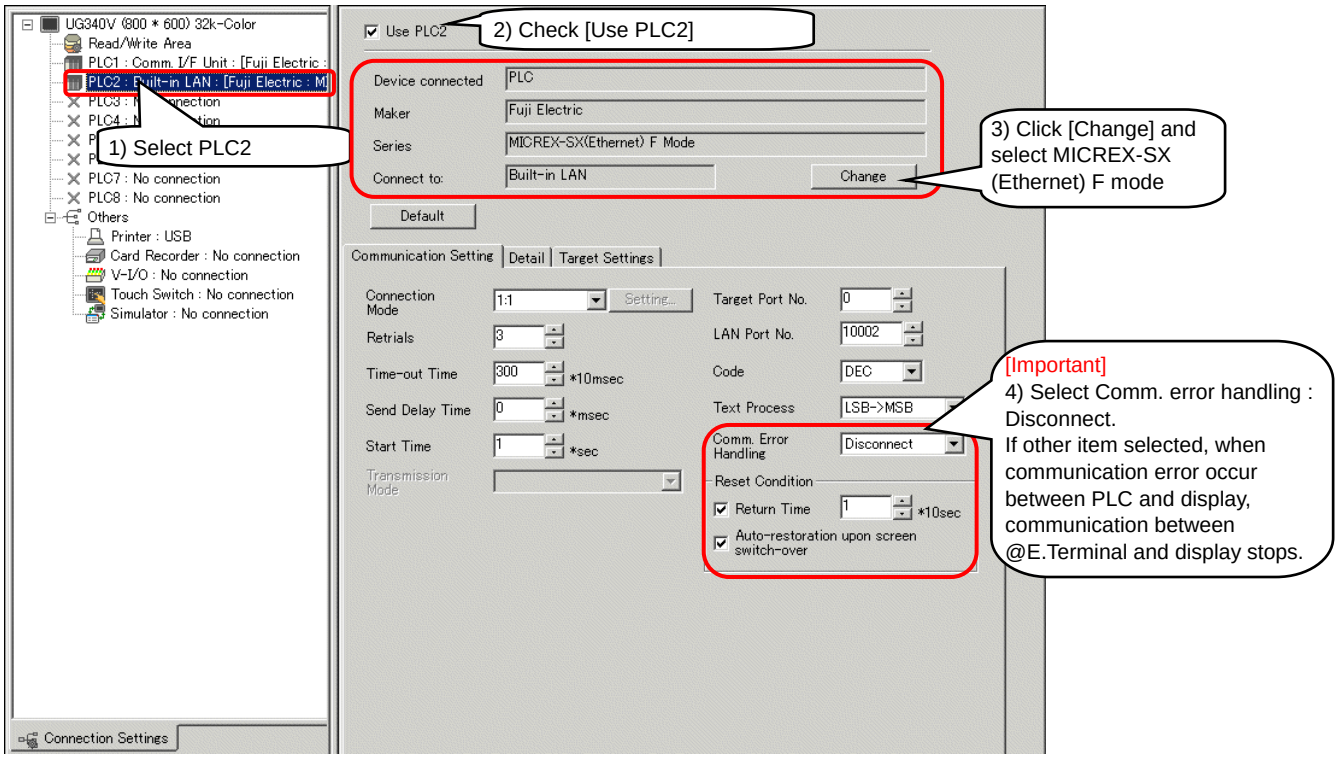
5-5 Communication Setting with PLC

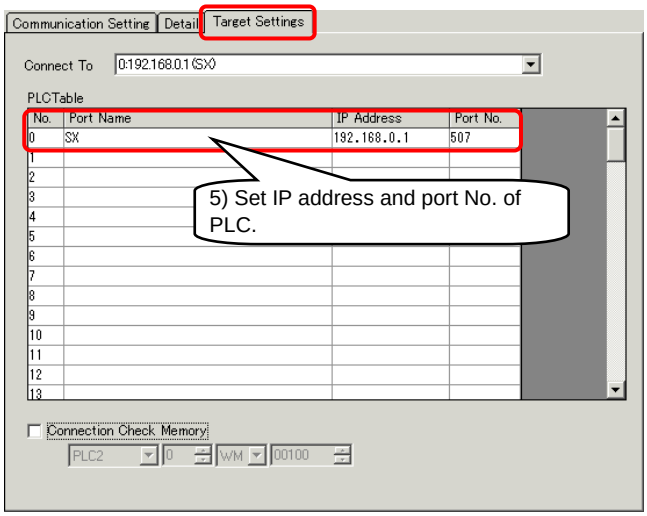
Communication with PLC is executed using 8way communication function of display unit.
Here explains setting method of editor software.

5-5-1 PLC communication setting

This example explains setting method of MICREX-SX Ethernet communication.
Use PLC Ethernet in default setting. IP address : 192.168.0.1, Port No. : 507

Open editor software, select [System setting] – [Device connection setting].
Set item as shown below.



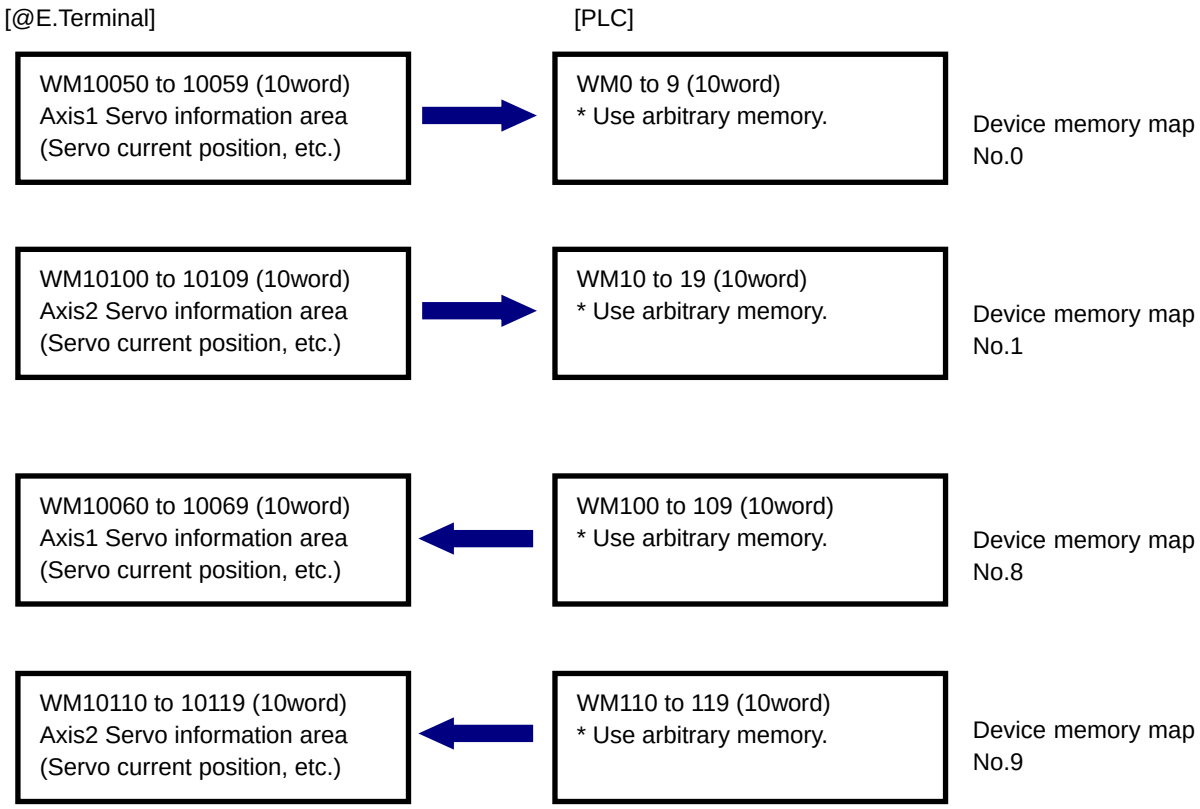


For other item, change setting depending on user system requirement.

5-5-2 PLC device emory map setting

Comminicate between @E.Terminal and PLC using Device memory map of display.
Use PLC2 Device memory map

Device memory map overview



@E.Terminal memory is fixed.

Editor setting method

Select [System setting] - [Device connection setting] - [PLC2]. Set device memory map as shown below.

◆ Device memory map No.0

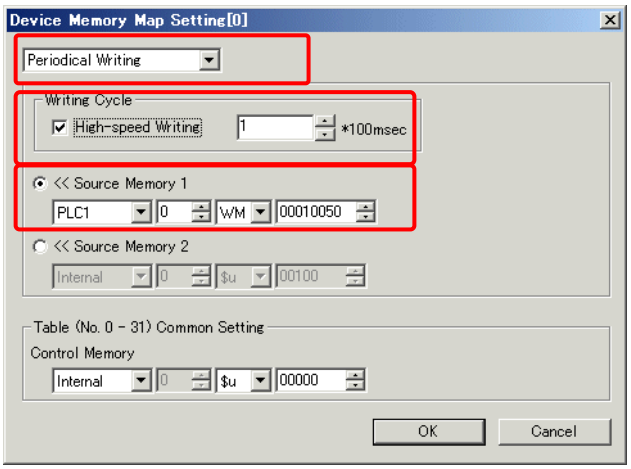
No.	PLC2 Memory	Name	Data Type	<< Source Memory 1	<< Source Memory 2
0	WM00000		Word	WM00010050	
1	WM00001		Word	WM00010051	
2	WM00002		Word	WM00010052	
3	WM00003		Word	WM00010053	
4	WM00004		Word	WM00010054	
5	WM00005		Word	WM00010055	
6	WM00006		Word	WM00010056	
7	WM00007		Word	WM00010057	
8	WM00008		Word	WM00010058	
9	WM00009		Word	WM00010059	

Double click

Select Periodical writing

Set 100ms

Set WM10050



◆ Device memory map No.1

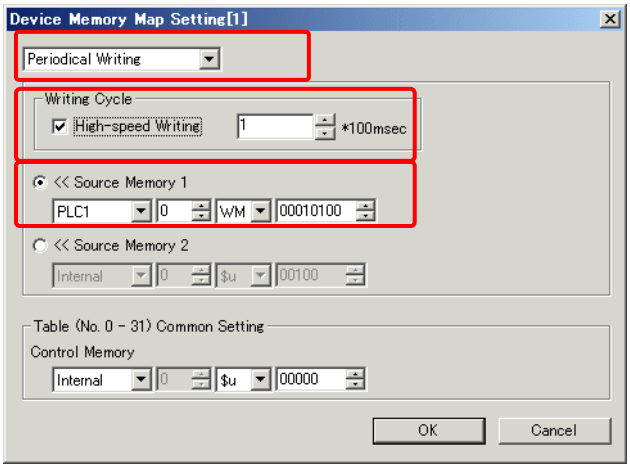
No.	PLC2 Memory	Name	Data Type	>> Target Memory 1	>> Target Memory 2
0	WM00010		Word	WM00010100	
1	WM00011		Word	WM00010101	
2	WM00012		Word	WM00010102	
3	WM00013		Word	WM00010103	
4	WM00014		Word	WM00010104	
5	WM00015		Word	WM00010105	
6	WM00016		Word	WM00010106	
7	WM00017		Word	WM00010107	
8	WM00018		Word	WM00010108	
9	WM00019		Word	WM00010109	

Double click

Select Periodical writing

Set 100ms

Set WM10100



◆ Device memory map No.8

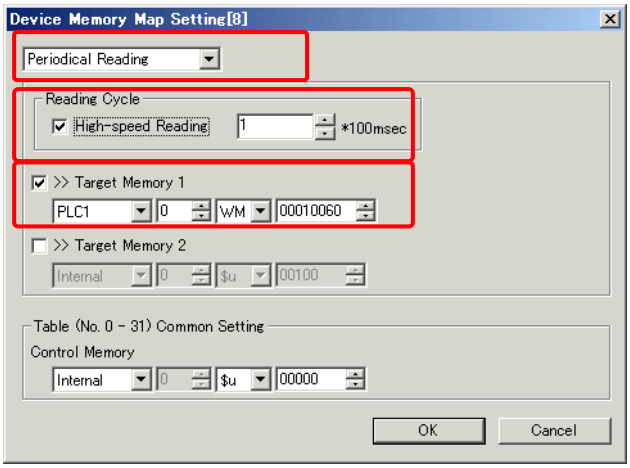
No.	PLC2 Memory	Name	Data Type	>> Target Memory 1	>> Target Memory 2
0	WM00100		Word	WM00010060	
1	WM00101		Word	WM00010061	
2	WM00102		Word	WM00010062	
3	WM00103		Word	WM00010063	
4	WM00104		Word	WM00010064	
5	WM00105		Word	WM00010065	
6	WM00106		Word	WM00010066	
7	WM00107		Word	WM00010067	
8	WM00108		Word	WM00010068	
9	WM00109		Word	WM00010069	

Double click

Select Periodical reading

Set 100ms

Set WM10060



◆ Device memory map No.9

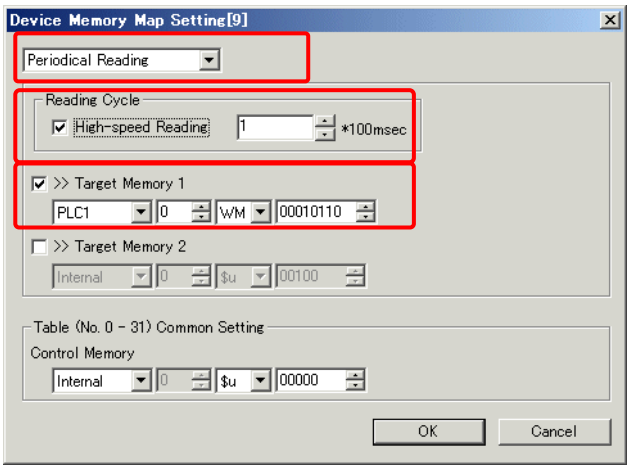
No.	PLC2 Memory	Name	Data Type	>> Target Memory 1	>> Target Memory 2
0	WM00110		Word	WM00010110	
1	WM00111		Word	WM00010111	
2	WM00112		Word	WM00010112	
3	WM00113		Word	WM00010113	
4	WM00114		Word	WM00010114	
5	WM00115		Word	WM00010115	
6	WM00116		Word	WM00010116	
7	WM00117		Word	WM00010117	
8	WM00118		Word	WM00010118	
9	WM00119		Word	WM00010119	

Double click

Select Periodical reading

Set 100ms

Set WM10110



For more detail of editing, refer to [V8 Series Connection Manual (2201NE)] [Appendix 1 Device memory map].

Appendix 1　How to Use Backup CD

App1-1　About Backup CD

Backup CD (accessory) contains @E.Terminal factory setting data, and data to customize by user.It is used to restore @E.Terminal to factory setting status, or add screen/control program by user.
If you insert backup CD to PC, license agreement dialog displayed. Confirm contents and close. Copy data in backup CD to PC using explore, and use it.

Folder configuration in backup CD is as shown below.

```
├──Display          Screen data folder to edit by user
├──Display_CF       Screen data folder to restore
├──Manual           Manual folder
├──System           System definition folder
└──System_CF        System definition folder to restore
```

(1) Screen data folder to edit by user

Screen data files which user can edit are stored. It have two folders [Expert] and [Standard]. Select folder depending on what loader you use for controller. Under those folders, there are three folders. Each folder is used depending on screen size. Each folder contains screen data file (*.V8).

```
├──Display
│   ├──Expert           For SX-Programmer Expert
│   │   ├──NP5M0101-2S4   (5.7 inch)
│   │   ├──NP5M0101-3H4   (8 inch)
│   │   ├──NP5M0101-4H4   (10 inch)
│   │   └──NP5M0101-5H4   (12 inch)
│   └──Standard         For SX-Programmer Standard
│       ├──NP5M0101-2S4   (5.7 inch)
│       ├──NP5M0101-3H4   (8 inch)
│       ├──NP5M0101-4H4   (10 inch)
│       └──NP5M0101-5H4   (12 inch)
```

(2) Screen data folder to restore

Screen data to restore Display unit to factory setting are stored. Restore screen data is made for SX-Programmer Standard.
Data are prepared for each screen size of @E.Terminal.

```
├──Display_CF
│   └──Standard         For SX-Programmer Standard
│       ├──NP5M0101-2S4   (5.7 inch)
│       │   └──MOTION8
│       ├──NP5M0101-3H4   (8 inch)
│       │   └──MOTION8
│       ├──NP5M0101-4H4   (10 inch)
│       │   └──MOTION8
│       └──NP5M0101-5H4   (12 inch)
│           └──MOTION8
```

(3) System definition folder

System definition (Program) flies which user can edit are stored. It have two folders [Expert] and [Standard]. Select folder depending on what loader you use for controller.

```
├──System
|   ├──Expert        SX-Programmer Expert file (.zwt)
|   |   ├──Eng       ・For English
|   |   └──Jpn       ・For Japanese
|   └──Standard      SX-Programmer Standard file (.Sxt)
|       ├──Eng       ・For English
|       └──Jpn       ・For Japanese
```

*1 SX-Programmer Standard file is made in template format. Before use it, register it as template in Loader.
*2 In case of English file, system definition is written in English. It is used to edit by English version Loader.

(4) System definition folder to restore

System definition data to restore Controller unit to factory setting are stored. Restore data is made for SX-Programmer Standard.

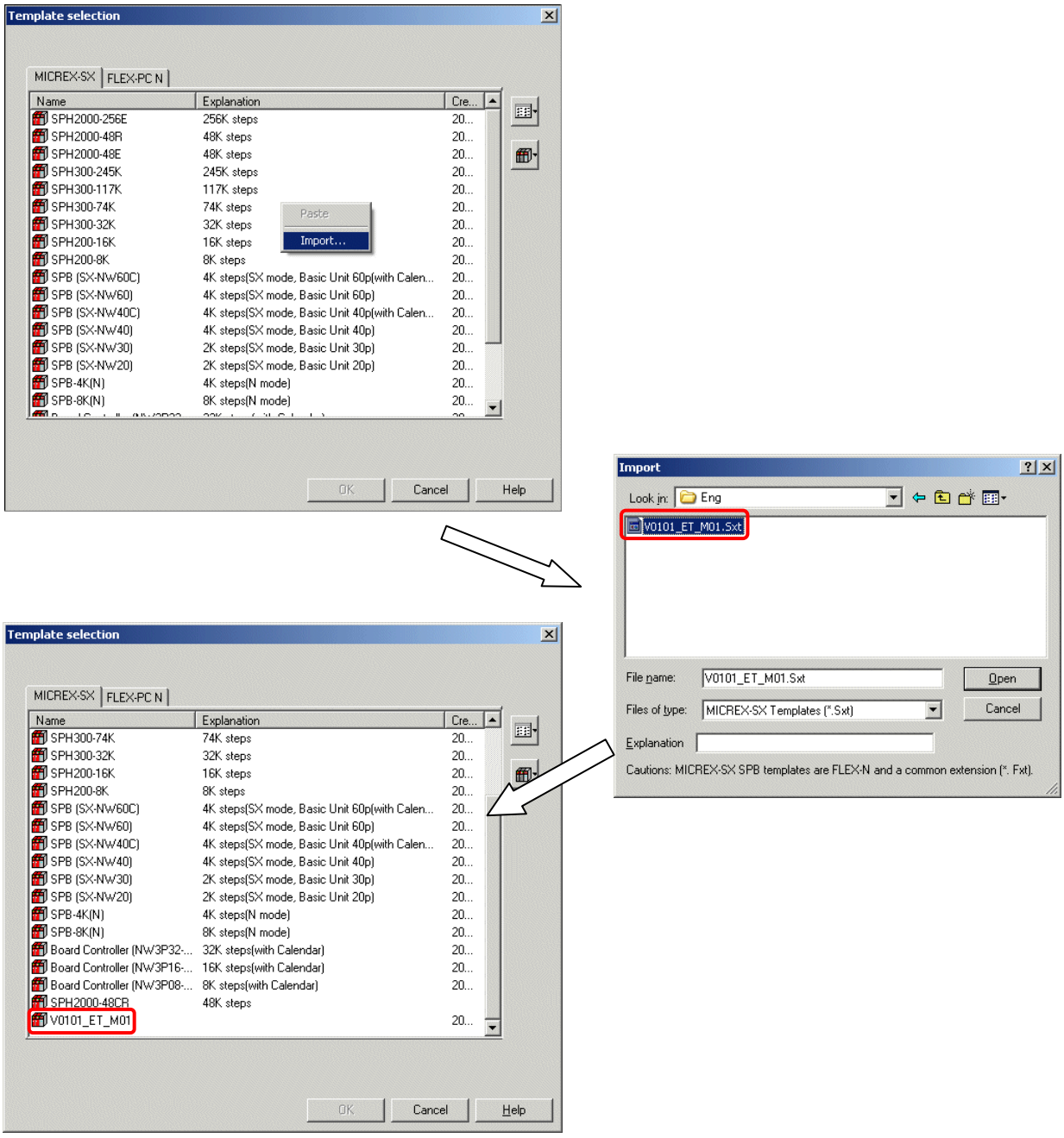
```
├──System_CF
|   └──Standard      For SX-Programmer Standard
|       ├──OTHER
|       └──PROJECT
```

Appendix 1　How to Use Backup CD

App1-2　Template Registration Procedure by SX-Programmer Standard

This procedure is used when create controller unit program using SX-Programmer Standard.

◆ [File] – [New]. [Template selection] screen displayed. Right click mouse under description area, select [Import]. Select template file at [Import] dialog, then click [Open].



Template of @E.Terminal for MC is registered at Template selection screen.

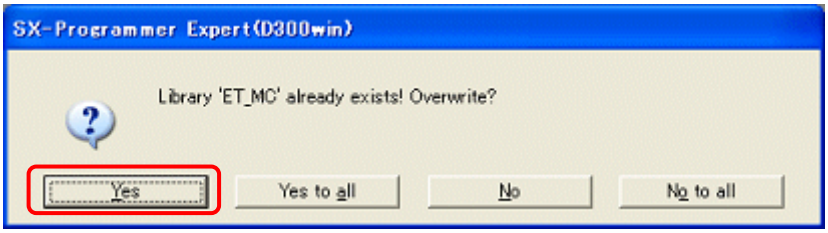
Appendix 1　How to Use Backup CD

App1-3　Template Registration Procedure by SX-Programmer Expert

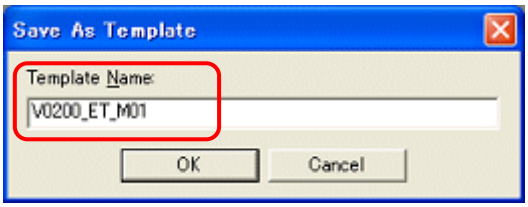
This procedure is used when create controller unit program using SX-Programmer Expert.

(1) [File] - [Open project/ Extract project]. [Open project/ Extract project] screen is displayed. Select a compressed project file, and extract the project file.

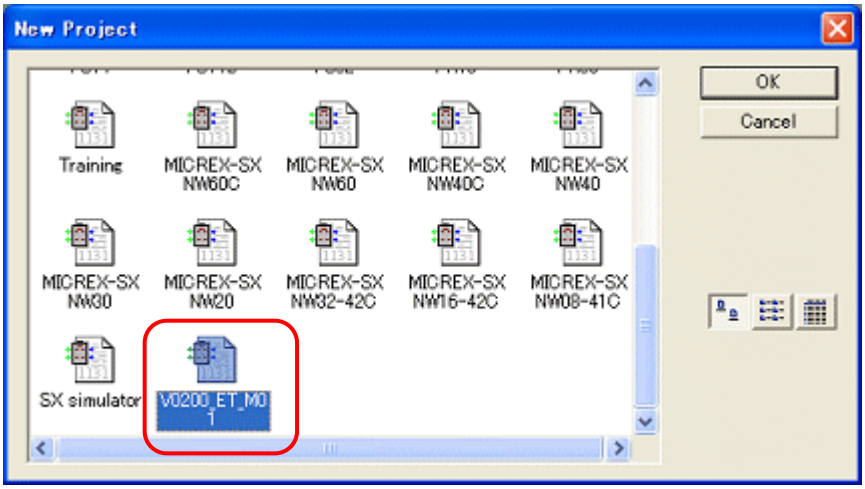
*When it has already been complete to extract a compressed project file for template, the confirmation screen for overwriting the library is displayed. If you want to overwrite it to new version, click [Yes].



(2) [File] - [Save as template]. [Save as template] screen is displayed. Enter “Template name” and click [OK].



(3) [File] – [New project]. [New project] screen is displayed. After completing the above procedure, it is available to select the registed template.



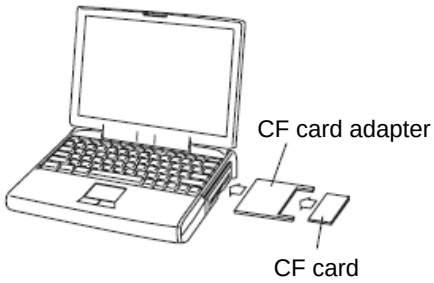
Appendix 1 How to Use Backup CD

App1- 4 Restore Screen Data

This section explains procedure to set Display unit screen data to factory setting.
Transfer screen data in backup CD to Display unit using CF card.

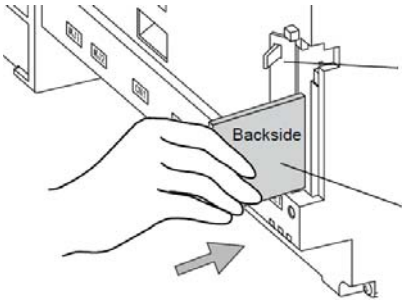
(1) Transfer screen data to CF card

Attach CF card to CF card adapter, and attach to PC.
Copy [\MOTION8] folder that is under [\Display_CF\Standard] folder in backup CD to CF card.



(2) Insert CF card to CF slot of display unit

Open CF card cover of Display unit, and insert CF card.



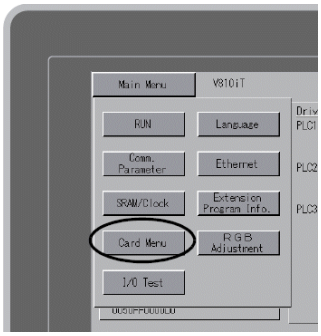
Note) After insert CF card, close CF cardcover to lock. (If cover is not locked, CF card is not recognized.)

* Do not remove/insert CF card after this procedure.

(3) Display [Card Transfer] screen

Press [SYSTEM] – [F1] and change screen to local menu. Press [Card menu] SW in [Main menu]. [Card transfer] screen is displayed.

[Main menu]



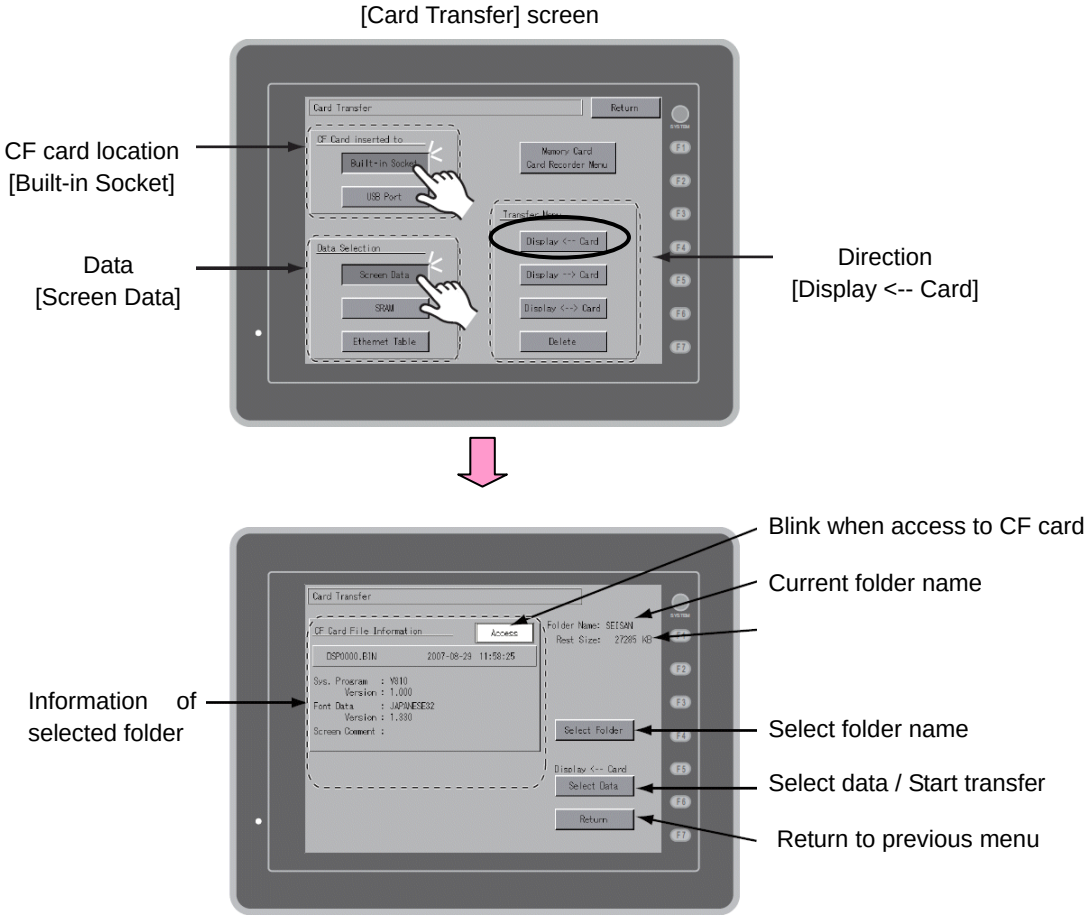
(4) Select CF card location, Data, Transfer direction

Select items as shown below.

CF card inserted to: Built-in Socket
Data Selection: Screen Data
Transfer Menu: Display <-- Card

Appendix 1 How to Use Backup CD

[Card Transfer] screen



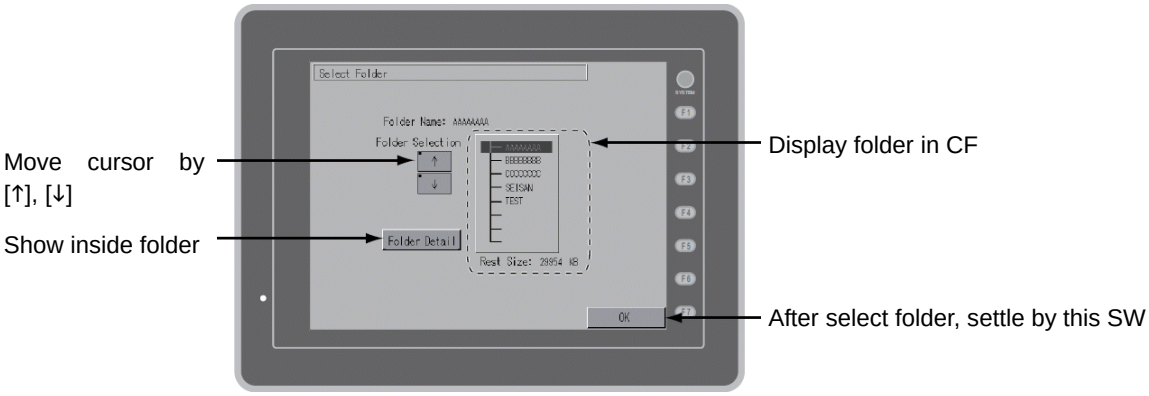
(5) Confirm access folder

Confirm current folder name. If folder name is [MOTION8], go to (7).
If you want to select other folder, go to (6).

(6) Change access folder

If you change folder, press [Select Folder].
[Select Folder] screen displayed. Select [MOTION8] folder, then press [OK].

[Select Folder] screen

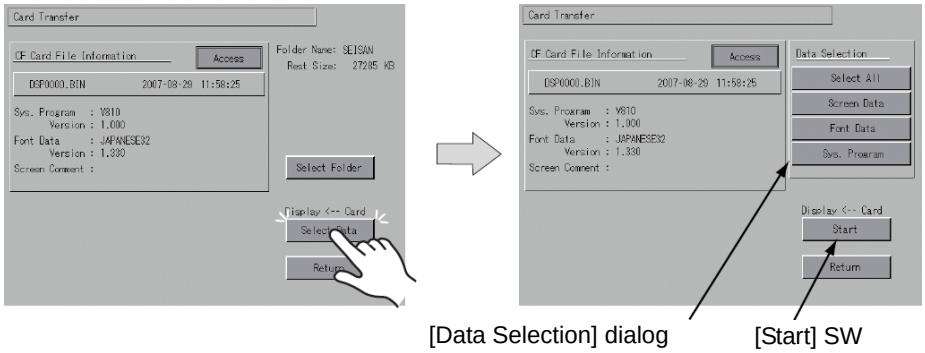


(7) Select Transfer Data

After selecting a folder, press [Select data] SW.

The [Data selection] dialog is displayed. At the same time, [Select Data] SW changes to [Start] SW.

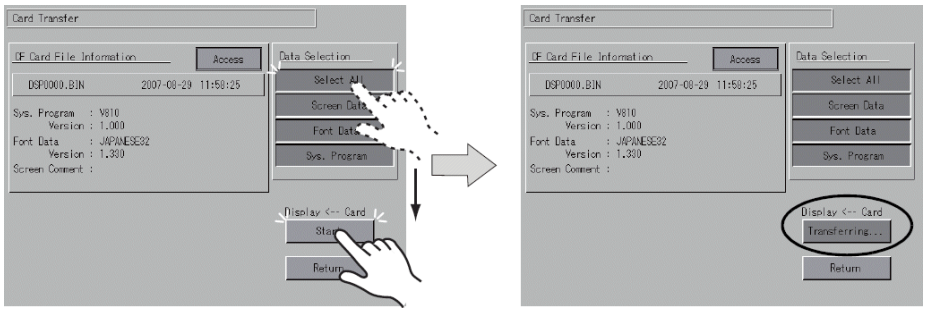
Data Selection



(8) Start transfer

Select data, and then press [Start] SW. SW name changes to [Transferring...]

Before transfer During transfer

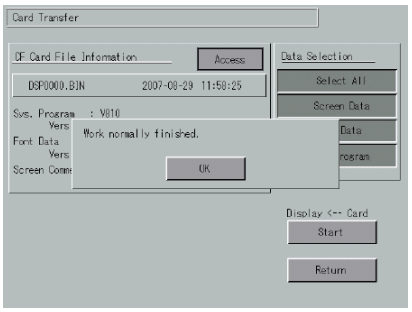


(9) Finish transfer

After finishing transferring, the following dialog displayed. Press [OK] SW.

However, if you select [Sys. Program] or [Select All] SW at [Card Transfer] menu, the screen automatically goes to [Main Menu] after transferring.

Finish transfer

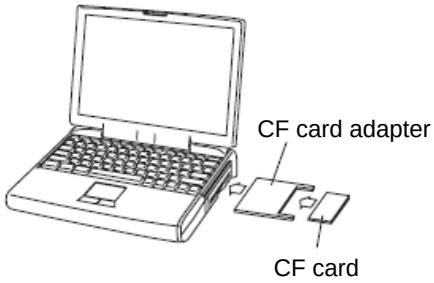


Appendix 1　How to Use Backup CD

App1-5　Restore Controller Data

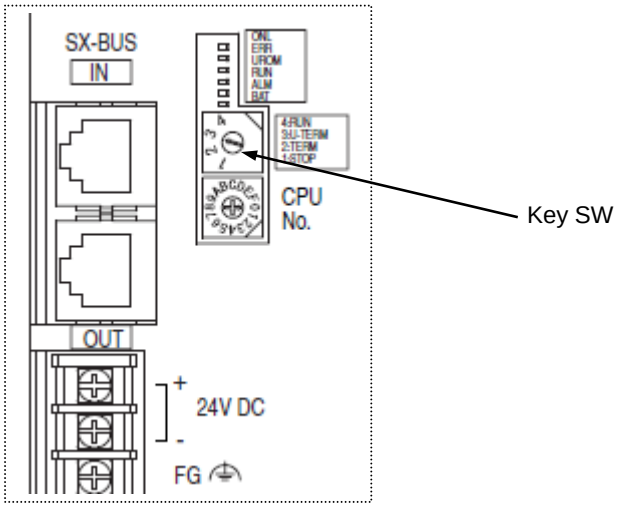
This section explains procedure to set Display unit screen data to factory setting.
Transfer screen data in backup CD to Display unit using CF card.

(1) Transfer system definition data to CF card
　　Attach CF card to CF card adapter, and attach to PC.
　　Copy all files and folders under [\System_CF\Standard] folder
　　in backup CD to CF card.



(2) Insert CF card to CF slot of controller unit.

(3) Set Key SW of controller unit to “3”(U-TERM).



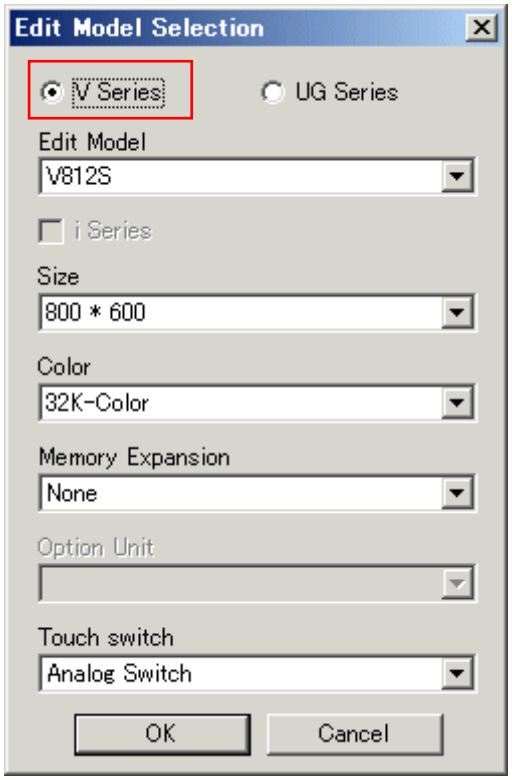
(4) Turn ON power of @E.Terminal. Data transfer automatically starts.
　After finish transferring, “UROM” LED stop blinking, then start operation.

Appendix 1　How to Use Backup CD

App1-6　Direction of old version screen data file (*.U4)

If you have screen data that is edited using V1.1.0.0 or before version backup CD file (*.U4 file), and transfer this data to V8 series Display unit, please convert *.U4 file to *.V8 file using screen editor V-SFT-5. Below shows convert procedure.

(1) Open screen data (*.U4 file) using Screen editor V-SFT-5.
(2) [System setting] – [Edit Model Selection]. Select “V series”, then click [OK].



Edit Model table

@E.Terminal types	UG series	V series
NP5M0101-5H4	UG540V	V812S
NP5M0101-4H4	UG440V	V810S
NP5M0101-3H4	UG340V	V808S

(3) Please save to create V8 series file (*.V8).

If you have screen data that is edited using V1.1.1.0 or later version backup CD file (*.V8 file), and transfer this data to UG40 series Display unit, please convert (*.V8) file to (*.U4) file using screen editor V-SFT-5.

Appendix 2　How to Change Japanese/English

@E.Terminal can change display language - Japanese/English. Language data is pre-installed in @E.Terminal. To change language, you have to change two items – “Screen data” and “System message”.

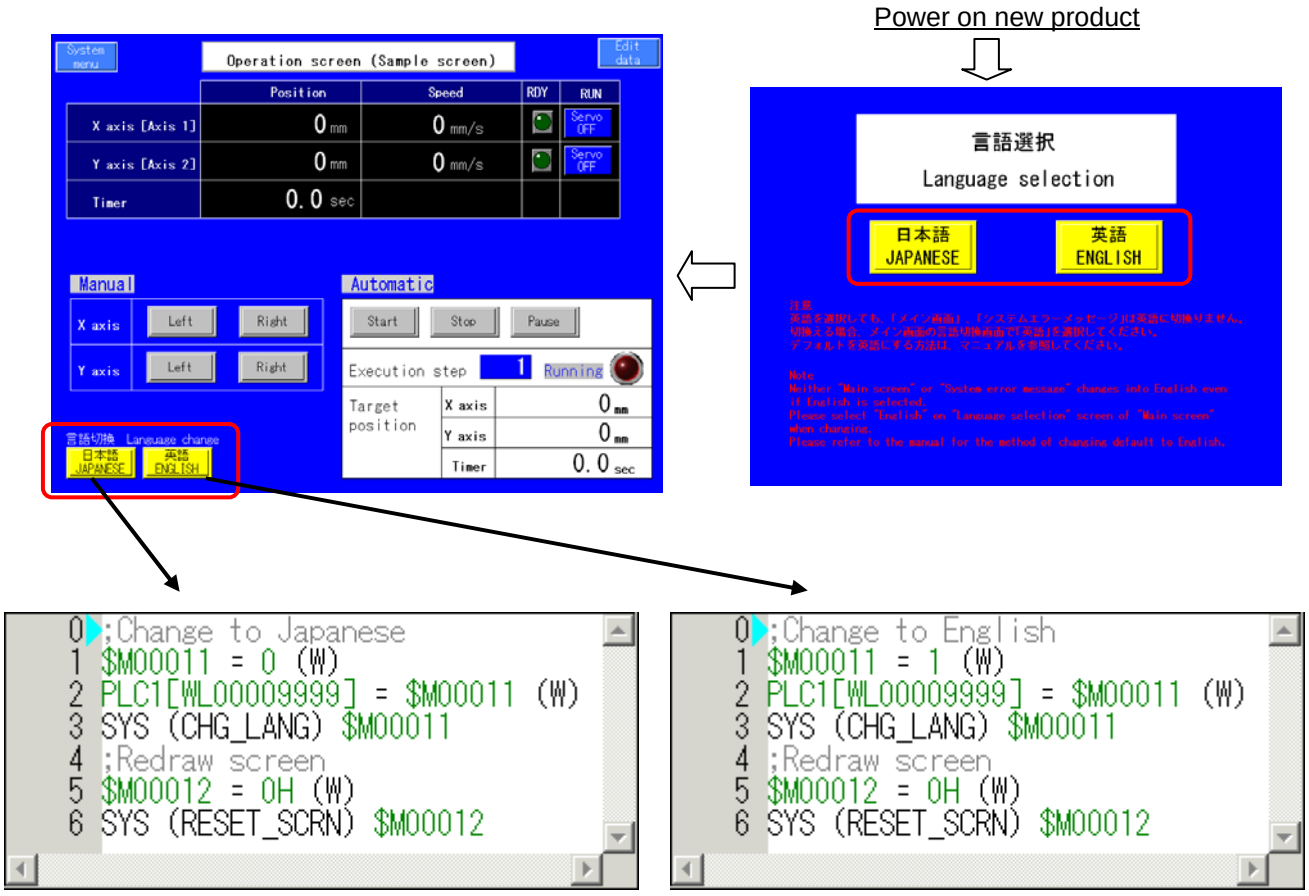
App2-1　Change Screen data Language

If new product, change screen data language by Language selection switch on “Language selection” screen or “Operation screen (Sample screen)”.
Below explains method to create Japanese/English changeover screen using user-edit screen data in Backup CD.

First (Japanese) and second (English) languages are registered in user-edit screen data. This changeover is operated by users as following two ways.

(1) How to change by Macro <SYS (CHG_LANG)>

User needs to create the Macro to change language.
Following is an example of the changeover Macro on sample operation screen.

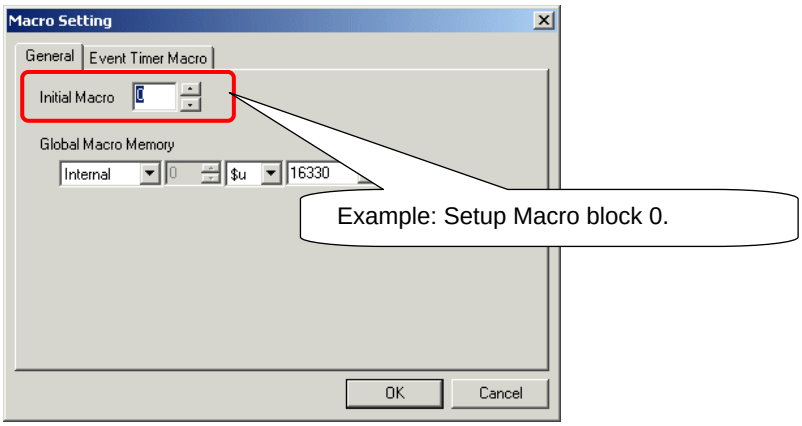


*There is no language change function as a standard function of contents.
* The language change does not have retain function. The information is kept by setting up initial Macro when it is powered on.

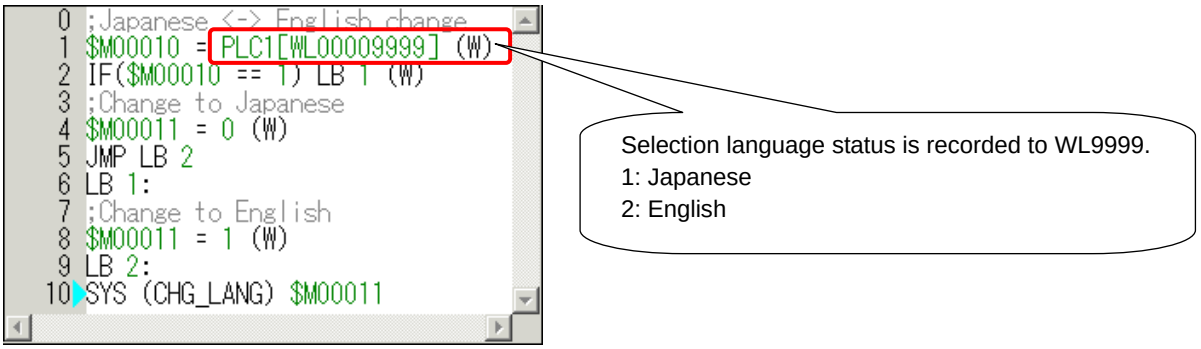
Appendix 2　How to Change Japanese/English

◆ Initial Macro setting

For initial Macro setting, select [System Setting] – [Macro Setting] on screen editor.



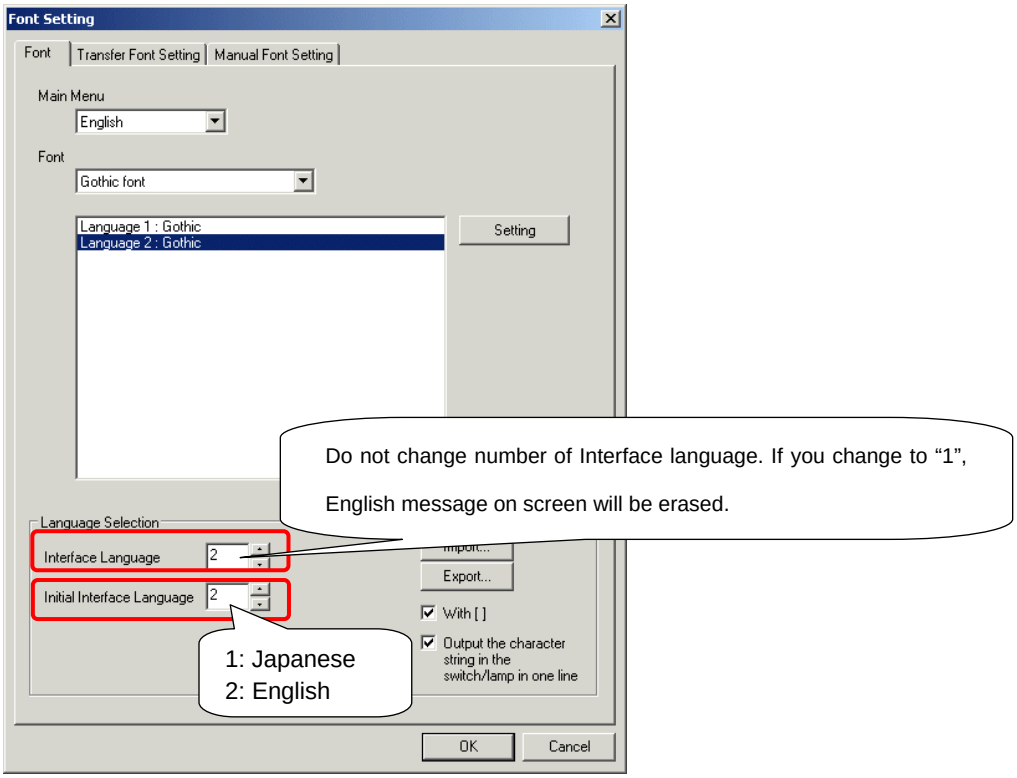
Entry following Macro on Macro block 0.


0 ;Japanese <-> English change
1 $M00010 = PLC1[WL00009999] (W)
2 IF($M00010 == 1) LB 1 (W)
3 ;Change to Japanese
4 $M00011 = 0 (W)
5 JMP LB 2
6 LB 1:
7 ;Change to English
8 $M00011 = 1 (W)
9 LB 2:
10 SYS (CHG_LANG) $M00011
Selection language status is recorded to WL9999.
1: Japanese
2: English

(2) How to change initial interface language.

Displayed language can be changed on screen editor. This is used when it is not necessary to change Language on user screen. (When user needs to use only one language.)

Select [System Setting] – [Font Setting] on screen editor.



Appendix 2　How to Change Japanese/English

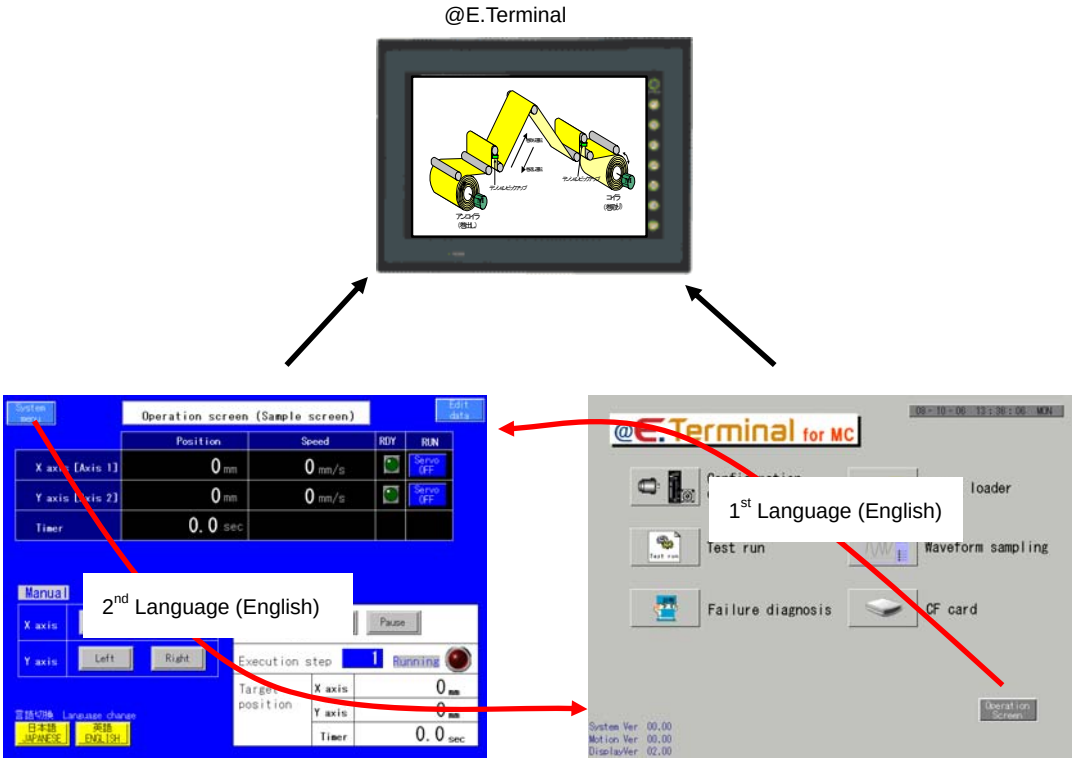
[Language change : advanced example]

<Overview>

System screen data provided by Fuji (screen number 800 to 1023) is made - 1st Language (Japanese) and 2nd Language (English). Generally, we recommend to make user screen data (screen number 0 to 799) also same setting. If you need only English screen, and would like to design user screen data in English and use 1st Language - English, please use below technique.

<Method>

To show only English, use Language change Macro at screen change SW.



User screen (Screen 0 to 799)

1st Language : English

2nd Language : Unused

System screen (Screen 800 to 1023)

Pre-installed

1st Language : Japanese

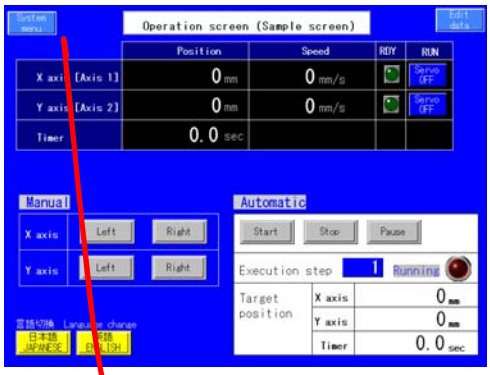
2nd Language : English

Appendix 2　How to Change Japanese/English

<Macro setting>

1) User screen Macro setting

Add below Macro at [System menu] SW. This SW change screen to System menu screen (No.910).




```
0 $M00000 = 910 (W)
1 SYS (SET_SCRN) $M00000
2 ;
3 ;Change to 2nd Language
4 $M00001 = 1 (W)
5 SYS (CHG_LANG) $M00001
```

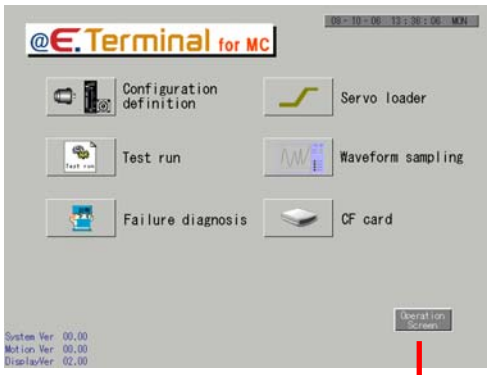
This is existing Macro.

This Macro change screen to 910.

With this Macro, change to 2nd Language.

2) System menu screen Macro setting

Add below Macro at [Operation screen] SW. This SW change screen to User screen.



Note

It is not possible to change menu of @E.Terminal. However, [Operation screen] SW is possible to edit.

```
0 $M00000 = 0 (W)
1 SYS (SET_SCRN) $M00000
2 ;
3 ;Change to 1st Language
4 $M00001 = 0 (W)
5 SYS (CHG_LANG) $M00001
```

This is existing Macro.

This Macro change screen to 0.

With this Macro, change to 1st Language.

Appendix 2　How to Change Japanese/English

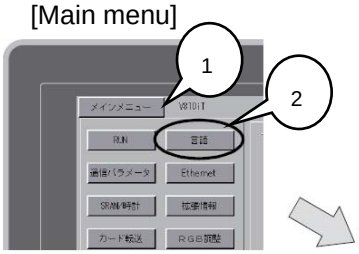
App2-2　Change System message Language

If new product, Japanese is displayed in System message. To change System message language to English, there is two way as shown below.

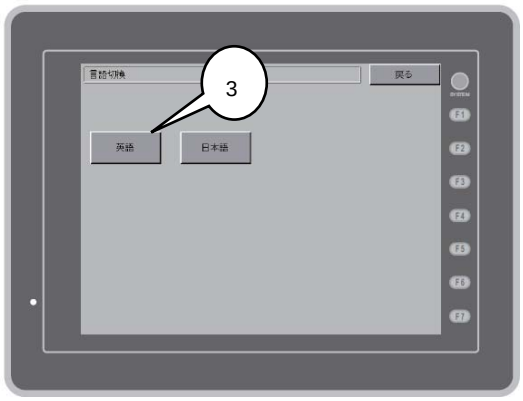
(1) How to change by @E.Treminal

◆ Press [SYSTEM] – [F1]. [Main menu] will displayed in Japanese.
Press screen SW by 1-2-3 order as shown below pictures.
System message changed to English.
* This setting is cleared by power off of @E.Terminal. If you want to keep English System message, use method (2).

[Main menu]

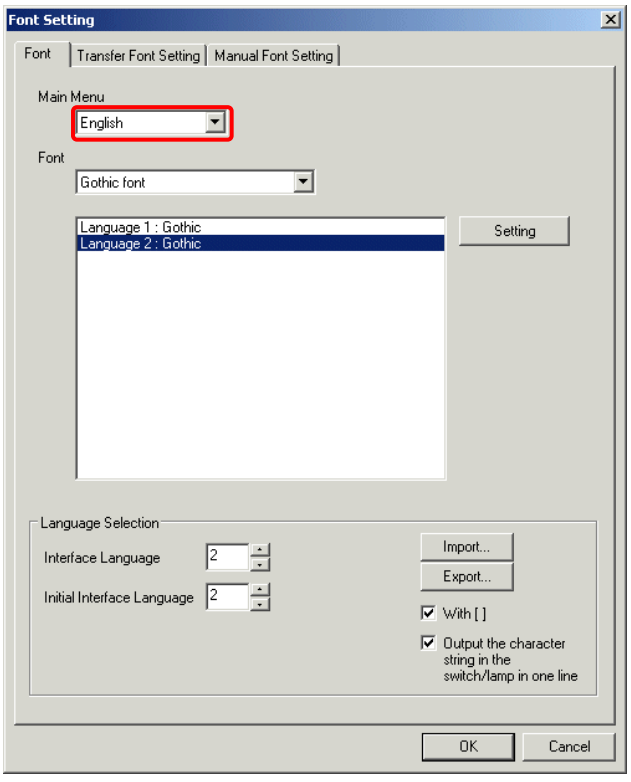


[Language selection] screen



(2) How to change by screen data setting

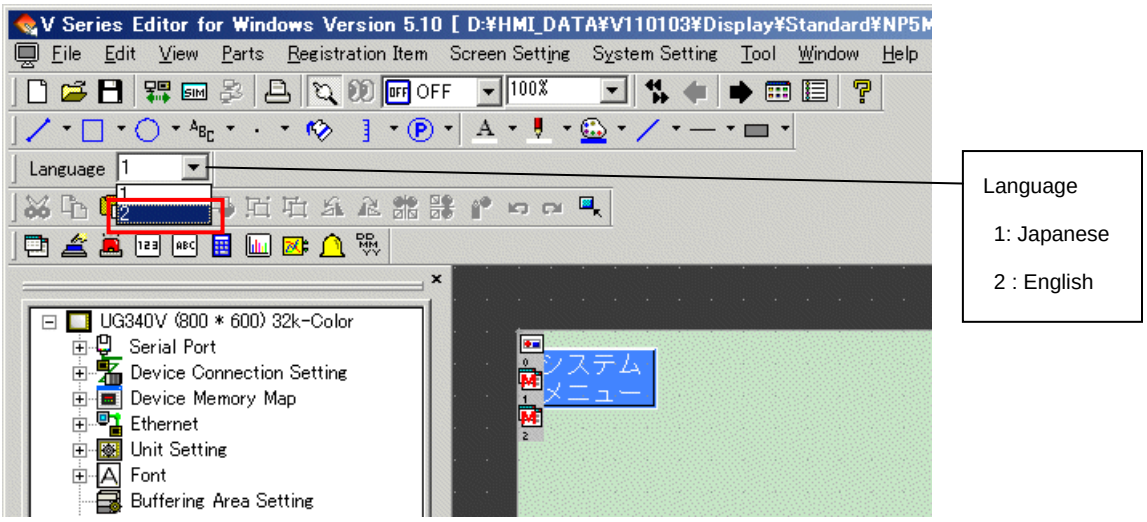
Open user-edit screen data in backup CD, change Main Menu language to English, then transfer screen data to @E.Terminal.
Select [System Setting] – [Font Setting] on screen editor.



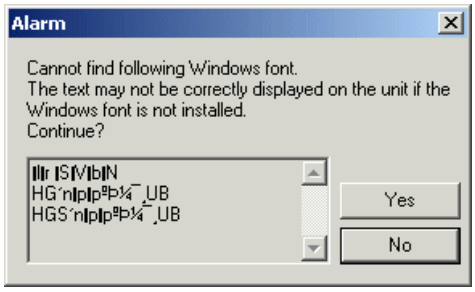
Appendix 2　How to Change Japanese/English

App2-3　Change Screen editor display Language

If you edit screen data in backup CD, please change display language to English as default display language is Japanese. Select Language “2” (English) as shown below.



Note1) When you open screen data file, below Alarm message will appear if Japanese font is not installed in your computer. Please ignore this message, click [Yes] to continue.


Alarm
Cannot find following Windows font.
The text may not be correctly displayed on the unit if the Windows font is not installed.
Continue?
Yes
No

Note2) When you open screen data file, system menu screen character may garble if Japanese font is not installed in your computer. However, it will shown correctly on Display unit.

Appendix 3 Expression Difference with Servo Loader

There is message difference between @E.Terminal and Servo Loader that have same meaning but different expression because of limited space on screen.
Below table shows different message list.

App3-1 Servo Parameter List

[FALDIC-α]

Item	No.	Servo Loader	@E.Terminal
Standard	25	S-curve(NL) filter coefficient	S-curve time
	37	Torque filter time constant	Torque filter time
	38	Speed regulator integ. time	Speed integral time
	39	Position regulator gain	Position regu. gain
	41	Speed setting filter time cons	Speed setting filter
	44	Vibration suppression T.C.	Vib. suppression time
	45	Vibration suppression gain	Vib. suppression gain
	55	* Positioning end output form	* In-pos. output format
	56	Positioning end output time	In-pos. output time
	57	Positioning end judgment time	In-pos. judgment time
	58	Overload ealy warning level	Overload warning level
	59	Maximum torque limit level	Max torque limit value
	72	* Origin return direction	* Origin ret. direction
	76	Origin detection creep speed	Creep speed at homing
System	22	* Parameter in RAM storag 1	* Parameter in RAM 1
	23	* Parameter in RAM storag 2	* Parameter in RAM 2
	24	* Parameter in RAM storag 3	* Parameter in RAM 3
	25	* Parameter in RAM storag 4	* Parameter in RAM 4
	26	* Parameter in RAM storag 5	* Parameter in RAM 5
	27	* Parameter in RAM storag 6	* Parameter in RAM 6
	28	* Parameter in RAM storag 7	* Parameter in RAM 7
	29	* Parameter in RAM storag 8	* Parameter in RAM 8
	30	* Parameter in RAM storag 9	* Parameter in RAM 9
	73	Monitor1.2 output form	Monitor1/2 output form
	76	Plus Soft OT detected position	+ Soft OT position
	77	Minus Soft OT detected position	- Soft OT position
	80	* Rotational dir. Changeover	* Rotation direction
	84	* Opration at undervoltage	* Opration at U.V.

Appendix 3 Expression Difference with Servo Loader

[FALDIC-ALPHA5]

Item	No.	Servo Loader	@E.Terminal
PA1	2	INC / ABS system selection	* INC/ABS system select
	3	Command pulse form selection	* Command pulse form
	4	Rotation direction selection	* Rotation direction
	5	Number of command input pulses per revolution	* CMD pulse/revolution
	6	Numerator 0 of electronic gear	Numerator 0 of e-gear
	7	Denominator of electronic gear	Denominator of e-gear
	8	Number of output pulses per revolution	* Out pulse/revolution
	9	Numerator of electric gear for output pulses	* Numerator of encoder
	10	Denominator of electric gear for output pulses	* Denominator of encoder
	11	Output pulse phase selection at CCW rotation	* Pulse phase at CCW
	12	Z-phase position offset	* Z-phase pos. offset
	20	Easy tuning: stroke setting	Easy tuning(stroke)
	21	Easy tuning: speed setting	Easy tuning(speed)
	22	Easy tuning: timer setting	Easy tuning(timer)
	23	Easy tuning: direction selection	Easy tuning(direction)
	25	Max. rotation speed (for position and speed)	Max speed (pos, speed)
	26	Max. rotation speed (for torque control)	Max speed (torque)
	27	Forward rotation torque limit	For. torque limit
	28	Reverse rotation torque limit	Rev. torque limit
	29	Speed coincidence range	Speed coinci. range
	31	Deviation unit selection	Deviation unit
	32	Zero deviation range / in-position range	Zero dev./In-pos range
	33	In-position output format	* In-position output
	34	In-position output time	In-pos output time
	35	In-position judgment time	In-pos judge time
	36	Acceleration / deceleration selection at speed control	Accel/decel selection
	41	Manual feed speed 1 for position and speed control / speed limit 1 for torque control	Manual feed speed 1
	42	Manual feed speed 2 for position and speed control / speed limit 2 for torque control	Manual feed speed 2
	43	Manual feed speed 3 for position and speed control / speed limit 3 for torque control	Manual feed speed 3
	44	Manual feed speed 4 for position and speed control / speed limit 4 for torque control	Manual feed speed 4
	45	Manual feed speed 5 for position and speed control / speed limit 5 for torque control	Manual feed speed 5
	46	Manual feed speed 6 for position and speed control / speed limit 6 for torque control	Manual feed speed 6
	47	Manual feed speed 7 for position and speed control / speed limit 7 for torque control	Manual feed speed 7

continued to next page

Appendix 3 Expression Difference with Servo Loader

continued from previous page

	51	Moving average S-curve time	S-curve time
	52	Low-pass filter (for S-curve) time constant	Low-pass filter time
	53	Command pulse smoothing function	CMD pulse smoothing
	54	Position command response time constant	Pos CMD response time
	57	Speed loop integration time constant 1	Speed integral time 1
	59	Torque filter time constant for position and speed control	Torque filter time
	60	Torque filter time constant for torque control	Torque setting filter
	66	Speed loop integration time constant 2	Speed integral time 2
	68	Acceleration compensation gain for position control	Accel. compensation
	70	Automatic notch filter selection	Automatic notch filter
	71	Notch filter 1 / frequency	Notch filter 1 freq.
	72	Notch filter 1 / attenuation	Notch filter 1 attenu.
	73	Notch filter 1 / width	Notch filter 1 width
	74	Notch filter 2 / frequency	Notch filter 2 freq.
	75	Notch filter 2 / attenuation	Notch filter 2 attenu.
	76	Notch filter 2 / width	Notch filter 2 width
	77	Automatic vibration suppression selection	Vibration suppressing
	78	Vibration suppressing anti resonance frequency 0	Anti resonance freq 0
	79	Vibration suppressing workpiece inertia ratio (vibration suppressing resonance frequency) 0	Workpiece inertia 0
	80	Vibration suppressing anti resonance frequency 1	Anti resonance freq 1
	81	Vibration suppressing workpiece inertia ratio (vibration suppressing resonance frequency) 1	Workpiece inertia 1
	82	Vibration suppressing anti resonance frequency 2	Anti resonance freq 2
	83	Vibration suppressing workpiece inertia ratio (vibration suppressing resonance frequency) 2	Workpiece inertia 2
	84	Vibration suppressing anti resonance frequency 3	Anti resonance freq 3
	85	Vibration suppressing workpiece inertia ratio (vibration suppressing resonance frequency) 3	Workpiece inertia 3
	86	Vibration suppressing damping coefficient	damping coefficient
	87	Model torque filter time constant	Model torq filter time
	88	Position loop integration time constant	Pos. integration time
	89	Position loop integration limiter	Pos. integration limit
	91	P/PI automatic change selection	P/PI automatic change
	92	Speed range for friction compensation	Friction compensation
	93	Coulomb friction torque for friction compensation	Friction torque
	94	Torque filter setting mode	Torque filter setting
	95	Model torque calculation selection / speed observer selection	Model torque calc.
	96	Speed limit gain for torque control	Speed limit gain

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Appendix 3 Expression Difference with Servo Loader

continued from previous page

PA2	1	Decimal point position of positioning data	Decimal point position
	8	Starting direction for homing	* Homing direction
	9	Reverse traveling unit amount for homing	Reverse travel amount
	10	Homing direction after reference signal detection	Homing direction
	11	Reference signal for shift operation	* Ref. signal for shift
	12	Reference signal for homing (Deceleration starting signal)	* Ref. signal for homing
	13	Home position LS signal edge selection	* LS signal edge select
	14	Home position shift unit amount	Home pos. shift amount
	15	Deceleration operation for creep speed	* Deceleration for creep
	16	Home position after homing completion	Home position
	17	Home position detection range	Home position detect
	18	Deceleration time at OT during homing	Decel. time at OT
	20	Interrupt traveling unit amount	Interrupt travel
	24	Selection of operation at OT during homing	* Selection of OT
	25	Software OT selection	* Software OT selection
	56	Speed limit selection at torque control	* Speed limit selection
	59	Deviation hold selection at torque limit	* Deviation hold select
	61	Action sequence at servo-on OFF	* Servo ON-OFF sequence
	62	Action sequence at alarm	* Alarm action sequence
	63	Action sequence at main power shutoff	* Power off sequence
	64	Torque keeping time to holding brake	Holding time to brake
	65	Braking resistor selection	* Braking resistor
	66	Flying start at speed control	* Flying start
	67	Alarm detection at undervoltage	* Alarm at undervoltage
	68	Main power shutoff detection time	* Power down detection
	69	Deviation detection overflow value	Deviation overflow
	72	Station number for communication	* Station number
	74	Parameter write protection	Para. write protect
	77	Initial display of the keypad	* Initial display
	78	Display transition at warning detection	* Display at warning
	89	Sequence test mode: mode selection	* Sequence test mode
	90	Sequence test mode: encoder selection	* Encoder selection
	91	Position command delay time (for VS)	Position command delay
	92	SX extension function (for VS)	SX extension function
PA3	36	Deviation clear input form	* Deviation clear input
	51	OUT1 signal assignment	* OUT 1 signal assign
	52	OUT2 signal assignment	* OUT 2 signal assign
	81	Monitor 1 signal assignment	Monitor1 signal assign
	82	Monitor 2 signal assignment	Monitor2 signal assign
	87	Monitor 1/2 output format	Monitor1/2 output form
	88	Command pulse frequency sampling time for monitor	CMD pulse sampl time
	89	Feedback speed sampling time for monitor	Speed FB sampling time

Appendix 3 Expression Difference with Servo Loader

App3-2 Servo Alarm List

[FALDIC-α]

No.	Servo Loader	@E.Terminal
03h	Amp Heat	Amplifier overheat
04h	resistor Heat	Braking resistor
05h	Over Flow	Deviation overflow
06h	Over current	Overcurrent
07h	Over speed	Overspeed
08h	High voltage	Overvoltage
09h	Low voltage	Control / Main power undervoltage
11h	Combination error	Motor combination error
12h	resistor Heat 2	Braking transistor error
1Dh	Data error Negative sign designation	Data error Negative sign

[FALDIC-ALPHA5]

No.	Servo Loader	@E.Terminal
04h	Internal braking resistor overheat / External braking resistor overheat	Breaking resistor / transistor error
09h	Control power undervoltage / Main power undervoltage	Control / Main power undervoltage
1Dh	Data error OUT-of range, 0 data written	Data error OUT-of-range, o written
1Eh	Data error Negative sign designation	Data error Negative sign

Genaral-purpose Interface Area

● External/Virtual master axis

WM10000 to WM10049

									F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	
							10000	+0	Position data (lower) [unit amount/pulse] - Virtual/External common																Motion → Controller
							10001	+1	Position data (upper) [unit amount/pulse] - Virtual/External common																
							10002	+2	Speed data [unit amount/unit speed] (lower) - Virtual/External common																
							10003	+3	Speed data [unit amount/unit speed] (upper) - Virtual/External common																
							10004	+4	Alarm status																
							10005	+5																	
							10006	+6	Virtual M axis running	Virtual M axis acc	Virtual M axis dec				Ext. PG selection	Virtual M axis selection									
							10007	+7	Synchronizing	Sync accelerating	Sync decelerating	Data read completion	Making cycle stop	Mark detection			Setting error		Incremental value error	Reverse rotation error	Mark error				
							10008	+8									Mechanical calculation overflow				I/0 write error	I/O write completion	Parameter write error	Parameter write completion	
							10009	+9														Unit. conv. overflow (sync)		Error Summary	
							10010	+10	Target speed [unit amount/unit speed] (lower)																Controller → Motion
							10011	+11	Target speed [unit amount/unit speed] (upper)																
							10012	+12																	
							10013	+13																	
							10014	+14																	
							10015	+15																	
							10016	+16	Sync cycle start	Virtual M axis run	Ext. pulse input inhibit					Alarm reset	Virtual M axis emer. Stop run							Current pos. pulse display	
							10017	+17		Cycle stop							Mark length measure start								
							10018	+18														I/O write command		Parameter write command	
							10019	+19	Data IF display edit inhibit	Data IF read inhibit															

Genaral-purpose Interface Area

● Motion axis

WM10050 to WM10449

1 axis	2 axis	3 axis	4 axis	5 axis	6 axis	7 axis	8 axis		F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	
10050	10100	10150	10200	10250	10300	10350	10400	+0	Feedback position (lower) [unit amount]																Motion → Controller
10051	10101	10151	10201	10251	10301	10351	10401	+1	Feedback position (upper) [unit amount]																
10052	10102	10152	10202	10252	10302	10352	10402	+2	Feedback speed [unit amount/s] (lower)/Parameter read value (lower)																
10053	10103	10153	10203	10253	10303	10353	10403	+3	Feedback speed [unit amount/s] (upper)/Parameter read value (upper)																
10054	10104	10154	10204	10254	10304	10354	10404	+4	Alarm status																
10055	10105	10155	10205	10255	10305	10355	10405	+5	FALDIC external counter																
10056	10106	10156	10206	10256	10306	10356	10406	+6	RDY	Positioning completion PSET	Homing completion			Interpolating			Emer. stop detection	+OT	-OT	Deviation error	Toggle error	Unit. conv. overflow (PTP)	Interrupt overrun	FALDIC alarm detection	
10057	10107	10157	10207	10257	10307	10357	10407	+7	Synchronizing	Sync accelerating	Sync decelerating	Data read completion	Making cycle stop	Cut output	Compensating phase	Continue accepted	Master axis cycle set error	Sync axis cycle set error	Incremental length error	Reverse rotation error		Sync width setting error			
10058	10108	10158	10208	10258	10308	10358	10408	+8	SV para write completion	SV para read completion	SV parameter write error	SV parameter read error				SV para mode response completion	Mechanical calculation overflow						Parameter write error	Parameter write completion	
10059	10109	10159	10209	10259	10309	10359	10409	+9														Unit. conv. overflow (Sync)		Error Summary	
10060	10110	10160	10210	10260	10310	10360	10410	+10	Target position (lower)/Write parameter setting (lower)																Controller → Motion
10061	10111	10161	10211	10261	10311	10361	10411	+11	Target position (upper)/Write parameter setting (upper)																
10062	10112	10162	10212	10262	10312	10362	10412	+12	Feedback speed [unit amount/unit speed] (lower)/Parameter No.																
10063	10113	10163	10213	10263	10313	10363	10413	+13	Feedback speed [unit amount/unit speed] (upper)																
10064	10114	10164	10214	10264	10314	10364	10414	+14	Preset data (lower) [unit amount]																
10065	10115	10165	10215	10265	10315	10365	10415	+15	Preset data (upper) [unit amount]																
10066	10116	10166	10216	10266	10316	10366	10416	+16	Servo ON	Manual forward rotation	Manual reverse rotation	Homing command	Homing command	PTP ABS	Preset	Alarm reset	Emergency stop	Positioning cancel	Suspend	Deviation clear				Current pos. pulse display	
10067	10117	10167	10217	10267	10317	10367	10417	+17	Sync command	Cycle stop	Mark detection selection			2-axis linear interpolation command	Interrupt positioning	Continue mode		Phase compen-sation							
10068	10118	10168	10218	10268	10318	10368	10418	+18	SV para write command	SV para read command						SV parameter model								Parameter write command	
10069	10119	10169	10219	10269	10319	10369	10419	+19	Data IF display edit disable	Data IF read inhibit															

Data Interface Area

● External/Virtual master axis WM11000 to WM11049

							11000	+0	External pulse input value [Pulse]	Motion → Controller
							11001	+1		
							11002	+2		
							11003	+3		
							11004	+4		
							11005	+5		
							11006	+6		
							11007	+7		
							11008	+8	Mark measurement length value (Processing of measuring length between marks for external PG)	
							11009	+9		
							11010	+10	Virtual master axis acceleration time [ms]	Controller → Motion
							11011	+11		
							11012	+12	Virtual master forced deceleration time [ms]	
							11013	+13		
							11014	+14		
							11015	+15		
							11016	+16		
							11017	+17		
							11018	+18		
							11019	+19		
							11020	+20	Mark detection range (Processing of measuring length between marks for external PG)	
							11021	+21		
							11022	+22	Disabled mark number (Processing of measuring length between marks for external PG) Range: 0 to 99 times	
							11023	+23		
							11024	+24	Disabled error count (Processing of measuring length between marks for external PG) Range: 0 to 99 times	
							11025	+25		
							11026	+26		
							11027	+27		
							11028	+28		
							11029	+29		
							11030	+30	Travel at startup	
							11031	+31		
							11032	+32	Travel at stop	
							11033	+33		
							11034	+34	Master axis travel per cycle	
							11035	+35		
							11036	+36	Reverse feed limiter	
							11037	+37		
							11038	+38		
							11039	+39		

Data Interface Area

● Motion axis

WM11050 to WM11449

1 axis	2 axis	3 axis	4 axis	5 axis	6 axis	7 axis	8 axis						
11050	11100	11150	11200	11250	11300	11350	11400	+0	Command position [unit amount]				Motion → Controller
11051	11101	11151	11201	11251	11301	11351	11401	+1					
11052	11102	11152	11202	11252	11302	11352	11402	+2	Master axis position in a cycle [unit amount]				
11053	11103	11153	11203	11253	11303	11353	11403	+3					
11054	11104	11154	11204	11254	11304	11354	11404	+4	Sync axis position in a cycle [unit amount]				
11055	11105	11155	11205	11255	11305	11355	11405	+5					
11056	11106	11156	11206	11256	11306	11356	11406	+6	Sync mode No. response				
11057	11107	11157	11207	11257	11307	11357	11407	+7					
11058	11108	11158	11208	11258	11308	11358	11408	+8					
11059	11109	11159	11209	11259	11309	11359	11409	+9					
									Ratio sync	Cycle sync	Rotary shear	Flying shear	
11060	11110	11160	11210	11260	11310	11360	11410	+10	Acceleration/deceleration time [ms]				Controller → Motion
11061	11111	11161	11211	11261	11311	11361	11411	+11	S-curve ratio [%]				
11062	11112	11162	11212	11262	11312	11362	11412	+12	Manual speed [unit amount/unit speed]				
11063	11113	11163	11213	11263	11313	11363	11413	+13					
11064	11114	11164	11214	11264	11314	11364	11414	+14	Sync axis cycle setting [unit amount]				
11065	11115	11165	11215	11265	11315	11365	11415	+15	Ratio_Sync axis	Sync axis travel per cycle	Sync axis travel per cycle		
11066	11116	11166	11216	11266	11316	11366	11416	+16	Master axis cycle setting [unit amount]				
11067	11117	11167	11217	11267	11317	11367	11417	+17	Ratio_Master axis	Master axis travel per cycle	Master axis travel per cycle	Master axis travel per cycle	
11068	11118	11168	11218	11268	11318	11368	11418	+18	Master axis min. cycle setting [unit amount]				
11069	11119	11169	11219	11269	11319	11369	11419	+19		Min. value of master axis travel per cycle	Min. value of master axis travel per cycle	Min. value of master axis travel per cycle	
11070	11120	11170	11220	11270	11320	11370	11420	+20	Reverse feed limiter [unit amount]				
11071	11121	11171	11221	11271	11321	11371	11421	+21		Reverse feed limiter	Reverse feed limiter	Reverse feed limiter	
11072	11122	11172	11222	11272	11322	11372	11422	+22	Travel at startup [unit amount]				
11073	11123	11173	11223	11273	11323	11373	11423	+23		Travel at startup	Travel at startup	Travel at startup	
11074	11124	11174	11224	11274	11324	11374	11424	+24	Travel at stop [unit amount]				
11075	11125	11175	11225	11275	11325	11375	11425	+25		Travel at stop	Travel at stop	Travel at stop	
11076	11126	11176	11226	11276	11326	11376	11426	+26	Master axis sync width [unit amount]				
11077	11127	11177	11227	11277	11327	11377	11427	+27			Master axis sync width	Master axis sync width	
11078	11128	11178	11228	11278	11328	11378	11428	+28	Sync axis sync width [unit amount]				
11079	11129	11179	11229	11279	11329	11379	11429	+29			Sync axis sync width	Sync axis sync width	
11080	11130	11180	11230	11280	11330	11380	11430	+30	Motion-specific parameter 1				
11081	11131	11181	11231	11281	11331	11381	11431	+31		Delay at startup	Delay at startup	Delay at startup	
11082	11132	11182	11232	11282	11332	11382	11432	+32	Motion-specific parameter 2				
11083	11133	11183	11233	11283	11333	11383	11433	+33		Min. value of sync axis travel per cycle	Acceleration length	Cut command delay	
11084	11134	11184	11234	11284	11334	11384	11434	+34	Motion-specific parameter 3				
11085	11135	11185	11235	11285	11335	11385	11435	+35			Deceleration length	Cut command time	
11086	11136	11186	11236	11286	11336	11386	11436	+36	Motion-specific parameter 4				
11087	11137	11187	11237	11287	11337	11387	11437	+37				Home position	
11088	11138	11188	11238	11288	11338	11388	11438	+38	Motion-specific parameter 5				
11089	11139	11189	11239	11289	11339	11389	11439	+39					
11090	11140	11190	11240	11290	11340	11390	11440	+40					
11091	11141	11191	11241	11291	11341	11391	11441	+41					
11092	11142	11192	11242	11292	11342	11392	11442	+42					
11093	11143	11193	11243	11293	11343	11393	11443	+43					
11094	11144	11194	11244	11294	11344	11394	11444	+44					
11095	11145	11195	11245	11295	11345	11395	11445	+45					
11096	11146	11196	11246	11296	11346	11396	11446	+46	Phase compensation length				
11097	11147	11197	11247	11297	11347	11397	11447	+47	Phase compensation processing				
11098	11148	11198	11248	11298	11348	11398	11448	+48	Phase compensation upper limit				
11099	11149	11199	11249	11299	11349	11399	11449	+49	Phase compensation processing				

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